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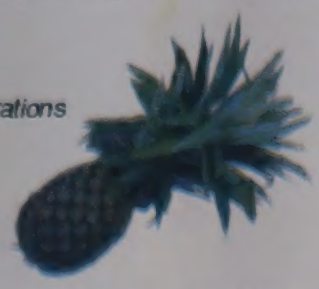

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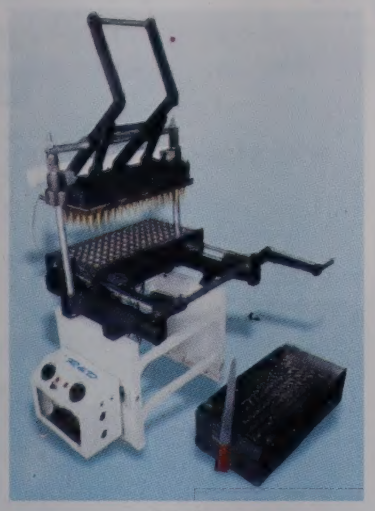

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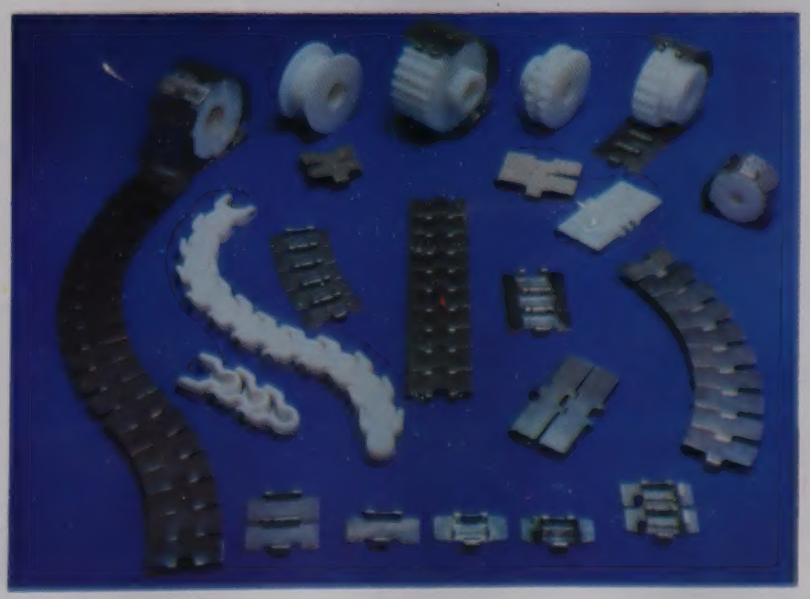

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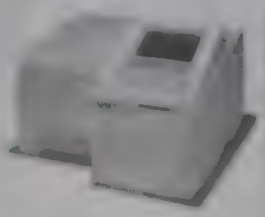

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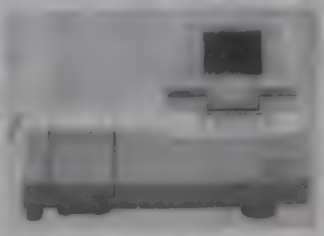

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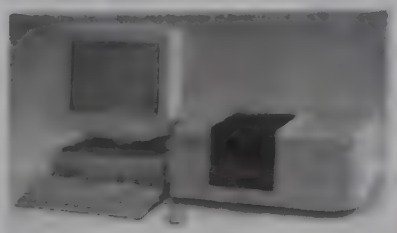

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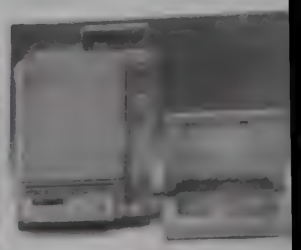

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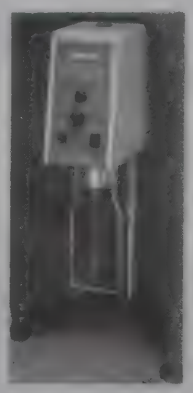

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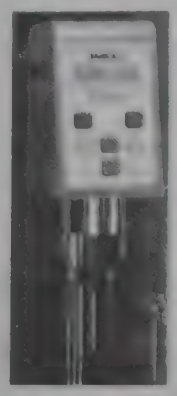

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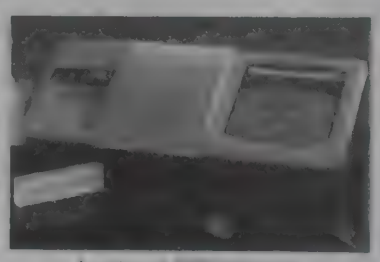

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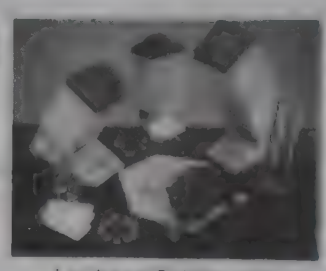

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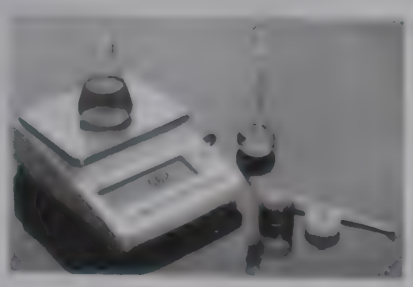

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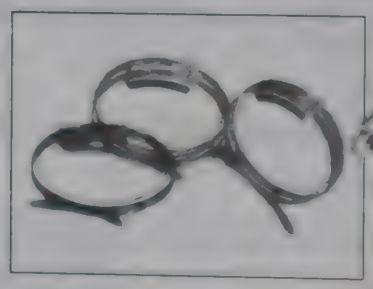

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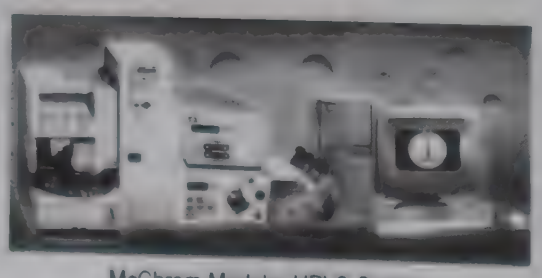

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Quality of Chicken Patties Incorporated with Milk Coprecipitates

by
Girish Patil, S. and M.K. Sanyal*

Abstract:
Attempts were made to improve the quality of chicken patties through incorporation of milk coprecipitates (MCP) into spent hen meat and byproducts. Chicken patties were prepared by using MCP separately at 7.5, 15.0 and 22.5% levels and compared with control. Level of MCP highly significantly (P < 0.01) influenced the contents of protein and ash as well as juiciness and significantly (P < 0.05) affected flavour, texture and overall acceptability of the products. MCP also significantly (P < 0.05) increased emulsion stability when compared with control. Among all samples, chicken patties prepared by using 15% MCP had highest emulsion stability, yield, contents of moisture, protein and ash and obtained highest scores for appearance and colour, flavour and overall acceptability.

Introduction:
Spent hens refer to old and culled chickens over their productive phase of life. Meat from such birds is tougher, less tender and less juicy as compared to broiler meat (Abe ***et al.,*** 1996). Products made by using spent hen meat are not preferred by the consumers mainly due to their tough texture. Milk coprecipitates (MCP), a mixture of casein and whey proteins, improves the functional properties such as emulsifying capacity, fat and water absorption, gelation etc., of the products in which it is incorporated (Van den Hoven, 1987). An attempt was, therefore, made to improve the quality of otherwise tougher chicken patties from spent hen meat and byproducts through the incorporation of MCP.

Materials and Methods
Sources of Raw Materials:
Broiler spent hens of 50 to 60 weeks of age, obtained from the Central Avian Research Institute, Izatnagar, were slaughtered at the experimental abattoir of the Institute. The dressed birds were deboned manually and by-products such as skin, fat, gizzard and heart as well as meat were collected for use. High calcium MCP was prepared from skimmed milk in the laboratory following the method of Fox (1992). The average contents of moisture, protein and ash in the spent hen meat and byproducts mixture were 63.69, 16.15 and 0.74% respectively and those in MCP were 64.7, 28.4 and 0.2% respectively.

Condiment mix was prepared by using fresh, peeled and sliced onion and garlic (3:1, w/w) followed by grinding to a fine paste in a domestic mixer.

Preparation of Chicken Patties:
Chicken patties was formulated, based on the natural proportions of lean meat (60.2%), skin (21.5%), fat (15.5%) as well as gizzard and heart in the ratio of 82:18 (2.8%) as present in spent hen carcasses (Kondaiah ***et al.,*** 1993). Meat and byproducts (4Kg) were minced in a mincer (make: Seydelmann, Germany), added with common salt, sodium pyrophosphate and ice cold water at 2.0, 0.5 and 2.0% levels respectively and 120 ppm of sodium nitrate, chopped for 1 min in a bowl chopper (make: Seydelmann, Germany) followed by addition of skin, gizzard and heart and chopping for 30 seconds. Condiments and ice cold water were added at 3.0 and 5.0% levels respectively and the contents rechopped for 30 seconds.

MCP was added separately at 7.5, 15.0 and 22.5% levels to the contents and chopped for 1 min followed by addition of fat and rechopping for 1 min. Subsequently, 1.5% Chicken masala powder (Brand: MDH, Gurgaon) and 3.0% wheat flour (maida) were added and the contents chopped for 1 min to prepare the emulsion.

Patties were formed (each from 70 g of emulsion), moulded into a round shape (diameter 7.5 cm, height 1.5 cm), placed on cooking trays presmeared with vegetable oil and cooked in a preheated hot air oven at 180 ± 5°C for 25 min. After 15 min, the patties were turned over and cooked for another 10 min to attain the core temperature of 73 ± 2°C. Control patties were prepared in a similar manner except that no MCP was used in its preparation.

Analysis:
Chicken patties were analysed for the contents of moisture, protein, fat and ash employing AOAC (1995) methods, pH as per Strange ***et al.,*** (1977) and shear force value using a Warner-Bratzler shear press (make: G.R. Elect. Mfg. Co., USA) following the method of Berry and Stiffler (1981).

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Emulsion was analysed for pH and stability as per the methods of Strange ***et al.,*** (1977) and Baliga and Madaiah (1970) respectively.

Sensory Evaluation:
Chicken patties were evaluated for appearance and colour, flavour, juiciness, texture and overall acceptability using a 8-point descriptive scale (Keeton, 1983) by a panel of 7 judges comprising scientists of the Institute. The judges received prior training about desirable and undesirable properties of chicken patties. In the scale, 8 denoted extremely desirable and 1 indicated extremely undesirable.

Statistical Analysis:
Data was analysed statistically following the procedure of Snedecor and Cochran (1967).

Results and Discussion:
The physico-chemical and sensory properties of chicken patties incorporated with different levels of MCP are presented in table 1 and 2 respectively. Level of MCP highly significantly ($P<0.01$) influenced the contents of protein and ash as well as the juiciness and significantly ($P<0.05$) affected the flavour, texture and overall acceptability of chicken patties.

Table 1: Physico-Chemical properties of chicken patties incorporated with different levels of milk coprecipitates (mean ± SE)*

Parameters	Control	Levels of milk co-precipitate (%)		
		7.5	15	22.5
Appearance and Colour	6.57±0.11^{a}	6.91±0.11^{b}	6.93±0.10^{b}	6.81±0.11^{b}
Flavour	6.67±0.11^{a}	6.88±0.11^{ab}	7.21±0.21^{b}	7.00±0.13^{ab}
Juiciness	6.81±0.10^{a}	7.00±0.15^{ab}	7.17±0.10^{bc}	7.45±0.10^{c}
Texture	6.62±0.12^{a}	6.86±0.10^{ab}	7.00±0.13^{b}	7.07±0.12^{b}
Overall acceptability	6.52±0.10^{a}	6.86±0.14^{b}	7.00±0.11^{b}	6.79±0.11^{ab}

* Means with different superscripts row-wise differ significantly ($P<0.05$)

Table 2: Sensory properties of chicken patties incorporated with different levels of milk coprecipitates (mean ± SE)*

Parameters	Control	Levels of milk co-precipitate (%)		
		7.5	15	22.5
Appearance and Colour	6.57±0.11^{a}	6.91±0.11^{b}	6.93±0.10^{b}	6.81±0.11^{b}
Flavour	6.67±0.11^{a}	6.88±0.11^{ab}	7.21±0.21^{b}	7.00±0.13^{ab}
Juiciness	6.81±0.10^{a}	7.00±0.15^{ab}	7.17±0.10^{bc}	7.45±0.10^{c}
Texture	6.62±0.12^{a}	6.86±0.10^{ab}	7.00±0.13^{b}	7.07±0.12^{b}
Overall acceptability	6.52±0.10^{a}	6.86±0.14^{b}	7.00±0.11^{b}	6.79±0.11^{ab}

* Means with different superscripts row-wise differ significantly ($P<0.05$)

Physico-chemical properties:
Yield, moisture, ether extract and shear force values in control chicken patties and those incorporated with 7.5 (I), 15.0 (II) and 22.5% (III) MCP varied from 87.31 to 89.34%, 58.47 to 59.89%, 21.85 to 22.32% and 0.51 to 0.62 Kg/cm^2 respectively and were not significantly affected by the use of MCP when compared with control. Replacement of meat by MCP in hot dog, mortadella and mutton patties also did not significantly influence yield, moisture, fat and shear force values of the products (Santos ***et al.,*** 1994.; Rao ***et al.,*** 1997).

Protein content in different types of chicken patties differed significantly ($P<0.05$) from each other and varied from 14.24 to 15.49%. Rudolph and Hansen (1986) reported that incorporation of 10% sodium coprecipitate increased the protein and decreased the fat content in meat products. Ash content of III was significantly ($P<0.05$) higher than those of control, I and II. The contents of protein and ash in chicken patties had a direct relationship with the level of MCP used. pH and emulsion stability in case of treated products differed significantly ($P<0.05$) from that of control but not among themselves. pH of emulsion of different types of chicken patties, however, was not significantly affected due to the use of MCP. According to Rao ***et al.*** (1997), emulsion stability of control mutton nuggets did not differ significantly from the treated ones made by incorporating 15% MCP into the formulation.

Sensory Properties:
Scores for appearance and colour, flavour, texture and overall acceptability obtained by treated chicken patties did not differ significantly among themselves. When compared with control, scores for appearance and colour of I, II and III, flavour of II, juiciness and texture of II and III and overall acceptability of I and II were significantly ($P<0.05$) higher. Level of MCP had direct relationship with juiciness and texture scores of chicken patties. Compared to control, use of MCP improved colour and juiciness in restructured chicken steaks (Bhoyar ***et al.,*** 1998) and palatability of smoked chicken sausages (Rao ***et al.,*** 1997).

It is concluded that use of MCP, in general, improved sensory characteristics of chicken patties when compared with control. Chicken patties incorporated with 15% MCP had better yield, emulsion stability, appearance and colour, flavour and overall acceptability compared to control and those prepared by using other levels of MCP.

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Role of Functional Foods in Diet

by
S.C. Varshney

You must have heard about the "French Paradox". The French diet is high in animal fats and low in fibre but the high incidence of arteriosclerosis and cardiac disease which would be expected from such a diet is absent. This is attributed to the fact that the French also consume large quantities of red wine, rich in natural antioxidants - polyphenols which prevent arteriosclerosis and hypertension. Soon after this theory received media attention in Japan, there was a rapid increase in demand for red wine. Food manufacturers immediately saw an opportunity and within months new products were launched containing-polyphenols from red grapes.

A similar theroy is for milk chocolates rich in polyphenols. This example of utilising polyphenols or extract of grape seed/skins or pine bark, which is a phytochemical and is many times more powerful than Vitamin C & E, is just to describe the utility of such functional ingredients in creating a "Functional Food".

According to the British Nutrition Foundation, a dietary ingredient that affects its host in a targeted manner so as to exert positive effects (so as to justify a health claim) can be classified as a "functional" ingredient. In other words, foods containing such ingredients – functional foods – are foods that have health giving properties over and above their nutritional value.

The Japanese definition of "Functional Food" is any food that has a positive impact on an individual's health, physical performance or state of mind, in addition to its nutritive values.

Functional food is basically a food derived from naturally occurring raw materials which is taken as a part of daily diet and have this additional functionality. The functionality can include such things as prevention and recovery from a specific disease, enhancement of immunity, control of physical and mental state and slowing down of the aging process.

Broadly, we can say that functional foods are one step ahead of healthy natural foods in assisting the therapeutic process of the body towards substitution of medicines.

The World market for functional foods has grown by about 60% over the period 1995-2000. This market was valued at US $50,000 million in 2000.

The aging population, advances in therapeutic knowledge of natural foods and changes in food consumption habits are all believed to have contributed to the growth of functional foods industry. As consumers become more aware of the links between diet and health, functional foods are also perceived by many as one answer – a quick fix solution – to unhealthy lifestyles.

The development of the functional foods market is based on several drivers (Fig.1) which are based on the positive contribution of functional foods to improve health in contrast to conventional foods to maintain health.

Fig.1

DRIVERS

Demand for

- Health & Longevity
- Quick/convenient solutions
- Natural products
- Preventive measures.

Due to

- Increasing health costs
- Prevention cure
- Greying population
- Encouraging self-health maintenance
- Consumer health awareness & choice.

They are largely based on the link "Diet-Health" and should fit the basic needs of the modern elite consumer for enduring health in a convenient and natural way.

Reduction of health costs has actively engaged the Japanese government as a contributor to the development of the functional foods market. However, western countries are still lagging behind. The European consumer is now becoming increasingly aware of the link between Diet & Health.

Health benefits attributed to functional foods are dependent on active or functional ingredients incorporated in them. Such ingredients are available abundantly in natural foods such as vegetables, fruits, cereals, nuts, milk and milk based products.

Some of the ingredients, which make food products functional, are:

- Dietary fibres
- Vitamins
- Minerals
- Anti-oxidants
- Oligosaccharides
- Essential fatty acids (including Omega-3)
- Flavonoids
- Phytochemicals
- Lactic acid bacteria cultures
- Lignins

Although, these functional ingredients are available in natural foods, our processing which is aimed at improving the 'taste', transforms these natural foods into "junk foods" devoiding their active functional ingredients or sometimes, in addition, make the processed food loaded with "toxins" which negatively affects the body metabolism. For example, any deep-fried food, whether a burger, puri or parantha, namkeen or sweets are loaded with toxins in the form of oxidised fatty acids as well as trans fatty acids besides being high in calories. These trans fatty acids are the transformed products developed by repeatedly heating the oil or ghee at frying temperature.

Another example is grinding of wheat where most of its fibres, vitamins and minerals are lost in making a fine atta. So, many natural foods supplied by nature qualify for functional food category provided these have been processed minimally. For example, while extracting the juice of a fruit, incase fibres are also crushed and extracted with juice, it become functional. Alternatively, a natural juice with added fibres or antioxidant vitamins or calcium also qualify for this category.

Theoretically, a functional food has to be 100% natural i.e. free from any additives such as synthetic colour or flavour or any type of preservative. The safety of many synthetic colours or flavours may not be doubtful from FDA

point of view but these synthetic ingredients also act as toxins inside the body and their regular use cause more harm than products without these.

The modern concept of processing functional foods is to select the basic raw material from nature after going through the prior reviewed research findings and convert the natural foods into processed foods keeping all active ingredients intact or even enhancing the quality of these functional ingredients while removing the toxins or unhealthy constituents. For example, soyabeans are processed in such a way as to remove its peculiar odour and taste without losing its quality of proteins, fibres, essential fatty acids, vitamins and also isoflavones. Soya flour, extracted or defatted by solvent and subsequently dried and crushed is difficult to qualify as functional food.

Another concept of processing a functional food is to combine some of the functional ingredients in a suitable base or bulk ingredient, which is also functional. For example, processing of milk puddings with skimmed/double tonned milk combined fibres, fructose, soya powder and nuts/dried fruits. Many such preparations have already been developed by "Som Santi" utilising highly functional ingredients while keeping the nutritional density high and calorific density of food low.

Optimum Nutrition

As nutrition science is moving from the concept of "adequate nutrition" to "optimal nutrition", new food products which have the potential to improve mental and physical well being and which may also reduce the risk of diseases, are being developed.

As a science based approach is essential, key partners from Europe's scientific community, governmental bodies and the food and agriculture industry have created a platform to establish the fundamental concepts for these functional foods.

All functional foods have a common denominator: they beneficially affect one or more target function in the body and the beneficial effect can be expected when they are consumed as part of a normal food habit.

While the European consumer is just becoming used to such innovative foods, in Japan, people have been using them for decades and in so doing, they have marched towards optimum nutrition and taken preventive health into their own hands.

Legislation:

Although functional foods may indeed play such important roles, it is crucial that their manufacturers are not allowed to make claims based on hearsay. In an attempt to ensure this, the United Nation's FAO/WHO, Codex Alimentarus, the Council of Europe and national regulators are drafting codes allowing only "well founded and justifiable claims" to be made. Under these codes, any health promoting claim on packaging must not be misleading and must be based on sound science.

It should be clearly shown that by eating the food in normal qualities, it has a physiological beneficial function such as, lowering blood pressure or a positive effect on a biochemical marker, such as, cholestrol which can be measured.

Examples of Functional Food Innovations:

FOOD	FUNCTIONAL BENEFITS
Live fermented milks and yoghurts with probiotic cultures	Improve digestive functioning
Margarine, Yoghurt, cheese spreads	Plant stereols and stanols reduce cholesterol and lower the risk of heart disease
Eggs rich in Omega-3 essential fatty acids	3-4 eggs a week would provide the same amount of n-3 fatty acid as recommended to help reduce the risk of heart disease.
Breakfast cereals	Added folic acid may help reduce the risk of babies being born with spina bifida.
Bread, Muesli style bars	Added isoflavones may help reduce the risk of breast and prostate cancers, heart disease and osteoporosis.

However, Japan was the first country to introduce an approval system enabling health claims to be made on specified functional products. Health claims may not be made on food and beverages without approval. The approval system, known as the FOSHU system (Food for Specified Health Use) was established in 1991.

In order to obtain approval the applicant must prove that the health claim is valid.

The approval claims include the following:

Oligosaccharides	–	Promotes the growth of befides bacterias in the intestines
Dietary fibres	–	Regulate the intestines and moderate sugar absorption
Inulin	–	Acts as soluble fibres and enhances calcium absorption
Soya proteins	–	Inhibit cholesterol uptake

Some of the benefits of Omega-3 fatty acids are given in Table 2.

Some Roles and Functions of Omega-3 Fatty Acids in Humans

- Neutral development
- Involvement in blood clotting
- Anticarcinogenic
- Decrease cholestrol level
- Slimming aid
- Membrane functioning
- Plasma TG clearing
- Inflammatory response
- Decrease arteriosclerosis

Processing and manufacture of functional foods is hi-tech area for the future. Developed countries have already moved in this direction as consumers are more health conscious there. Food technologists should adopt this category of food for conducting research in coming years and the one who takes the lead will be a sure winner in the future.

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Simplified Non-Destructive Measurement of Vacuum in Canned Vegetables using Gross Weight

by
S.G. Patwardhan

Abstract:
Bittergourd in brine can, was tested by vacuum gauge can tester. Through the hole in the punctured can, 3% brine was filled in the head space by a syringe. A burette was fixed in the hole. On heating the expansion of brine was measured as A. Density of bittergourd in brine was determined as B. Using gross weight as basic figure, with the use of A & B the general gas law was utilised to calculate vacuum in any other intact can of bittergourd in brine.

Introduction

The research paper on "Non-destructive measurement of vacuum in canned vegetables (Patwardhan) has established the flip puff pressure for an empty sealed A1 tall can as 831 mm at sea level. It has clearly brought out that the initial Head Space (HS) V1 shrinks to a certain volume V2 and when the pressure crosses 831 mm the can flip puffs. However the whole method is lengthy and tedious. Experiments were therefore undertaken to determine expansion of the brine in the vegetable-in-brine can to aid in estimation of V2 from V1. It was proposed to get V1 from gross weight of the can.

Materials and Methods

Canned bittergourd in brine and also drumstick in brine were commercially manufactured by Vimal Agro Products Pvt. Ltd. Bardoli. Celsius & Fahrenheit mercury thermometers, cloth, SS vessel having, diameter, 600 mm and height 127 mm, cotton plug, weighing balance upto 1 kg., gas stove, vacuum gauge can tester, 50 ml. burette with screw clamp, rubber tube for covering the burette tip, common salt; water, electrical mixer/blender, measuring cylinder 10 ml. were used.

Experiment 1: Determination of FPT: An intact can of bittergourd in brine was weighed to get gross weight. The can was kept on folded cloth inside a SS vessel. Water was poured into the vessel to keep the water level 50mm above the bottom of the can. The vessel was kept on gas stove of 3" diameter and heated. A thermometer was held slightly pressed against the surface of the can. At a certain temperature namely Flip Puff Temperature (FPT) the can flip puffs. This was recorded.

Experiment 2: Vacuum Measurement: After cooling, the sealed can of bittergourd in brine the vacuum was measured by vacuum gauge can tester as T.

Experiment 3: Estimation of expansion of brine: The hole on the can surface was slightly enlarged with a screw driver, so that inverted burette can be fitted tightly into it. 3% salt solution, almost same as the covering brine in canned bittergourd was fitted into the HS of the can with a syringe: while tapping against the table surface.

A burette tip was covered with a rubber tube and the same was introduced into the can surface hole so that the rubber covered burette tip tightly filled into the hole; the rubber assisting in the tightness. At this point, some brine came into the burette tip, where the initial mark was made. When we heat the can like in experiment 1 the hole is likely to expand and therefore we have to hold the burette slightly pressed against the hole. The initial temperature was 27° C or 80.6° F. The can was now heated as in experiment 1. in water bath. Brine level in burette went on rising. Degree temperature and ml. reading was recorded. After the experiment was over 3% salt solution was filled into the burette and the quantity it held from 0 ml to the initial mark of brine in the burette was measured by emptying the burette upto 50 ml mark into a 100 ml measuring cylinder. The quantity was found to be 53.7 ml. The quantity of ml of expansion against temperature is given in Table-1.

Experiment 4: Density of bitter-gourd paste: This was determined by weighing the paste to a certain mark in 50 ml. beaker, divided by the weight of the water upto the same mark. Drumstick paste density was also

Table - I
Quantity of M.L. Expansion Against Temperature

Temperature		Expansion in ml
°F	°C	
100	37.5	4.4
110	43.8	8.2
120	48.9	13.1
124	51.1	16.8
130	54.6	22.9
135	57.5	29.5
140	60.0	34.3
145	62.5	44.6
150	65.6	50.1

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determined.

Experiment 5. Expansion of bittergourd paste: The bittergourd paste was made from the pieces taken out of the can. The HS at this stage was 17.0 mm. The can with the paste was heated like experiment 1 in water bath from Room Temperature (RT) of 26° C to 70° C.

Experiment 6: Expansion of brine: 3% salt solution was filled in empty can and heated like experiment 1 The brine level before and after was measured at 26° C to 70° C.

Experiment 7: Flip puff pressure determination: An empty, both sides seamed A1 tall can were heated in water bath as in experiment 1 to determine flip puff pressure.

Experiment 8: Vacuum in can and drumstick in brine: Gross weight and FPT were determined. Vacuum was measured by vacuum gauge can tester. The drained weight was determined. The drumstick pieces were made into paste. Density of the paste was determined like experiment 4.

Results and Discussion

In experiment 7 the FPT was found to be 55° C. when the RT was 27° C. Thus we can use General Gas Law (GGL) to get the pressure puffing.

$$\frac{P}{273-55} = \frac{760}{273+27} \text{ i.e} = \frac{328 \times 760}{300} \quad 830.93 = 831 \text{ mm}$$

Where 760 mm is the barometric pressure at sea level.

In experiment 5 in the bittergourd paste can, the HS was 170 mm at 26°C CRT: which reduced to 11.0 mm at 70°C on heating on the lines of experiment 1 whereas in experiment 6 the brine level at 9.3 mm in the can rose to 9.4 mm when the temperature rose from 26°C to 70°C and at the same time the internal height of the can from bottom seam mark to top seam mark rose from 109 mm to 110 mm. Thus in effect the HS did not change in experiment 6

Experiment 6 shows that whereas the brine expansion was almost equal to tin can expansion it effectively does not change the HS. However experiment 5 shows that rate of expansion of vegetable is much higher than brine. Therefore the shrinkage of the initial HS at RT on heating to just 0.1 degree below FPT depends on the vegetable content. However assuming that the vegetable is about 55% the minimum laid down under FPO, we can find the shrinkag of the HS. The shrinkage of HS can be related to expansio of brine given in Table I. Table II gives the parameters lea ding to calculation of vacuum in can without puncturing i

In experiment 4 the density of bittergourd in brine ca was determined. Weight of bittergourd paste 34.98 gm divided by weight of equal volume of water 32.95 gm., gav the density as 1.0616. The brix of the covering brine wa 4°C and the density 1.0268 by reference to Hodgman Assuming weight of the bittergourd contents as 55°C, th density of the whole product comes to 1.0459. The wate holding capacity of the can was 454 ml. Therefore 454 1.0459 gives 474 gm as the maximum capacity fo bittergourd in brine weight on the basis of 55% vegetabl content. Therefore the gross weight of such a can will b 474 + 68 gm. the weight of empty can = 542 gm.

In the experiment 8 the density of drumstick paste wa found to be 1.0679, that of covering brine of 6 brix, 1.041 and thus on the basis of 55% drained weight, that of the product as 1.0564. Thus the maximum capacity gross weight is 454 × 1.0565 = 479.65. Thus including the ca weight of 68 gm., the gross weight will be 547.65.

Now from V1 we deduct the expansion of brine at the FPT to get V2. The parameters resulting into determinatio of vacuum in drumstick can is given in Table III.

Table - II : Reading for Determination of Vacuum

Sr. No.	Parameters	Bittergourd in brine				
1.	RT + 273 = T1	297	299.65	301	301	303
2.	Vapour Pressure at T1 in mm	22.3	26	28.349	28.349	31.824
3.	FPT + 273 = T2	324.5	345.5	319	322	326.3
4.	Vapour Pressure at T2 in mm	100	104	76.43	88.02	109.3
5.	VP (4-2) in mm as J	77.7	78	48.1	59.68	77.5
6.	831 mm – J = p2 in mm	753.3	682	783	771.3	753.5
7.	Gross Weight of sealed can in gm as L	490	465	502	505	482
8.	542-L–M in gm	52	77	40	37	60
9.	M/1.045 = v1 in ml.	49.76	73.68	38.28	35.40	57.4
10.	V1 - ml. expansion at FPT = v2 ml	33	54.78	27.58	22.30	37.5
11.	P1 mm	456	440	532	454	456.6
12.	760 - pl = Vacuum in mm & inches	304.125	320.13	228.9	306.12	303.12
13.	Vacuum in inches by vacuum gauge	13	14	8	12	12

Table - III Reading for Determination of Vacuum

Sr. No.	Parameters	Drumstick in brine
1.	RT - 273 = T1	296.3
2.	Vapour Pressure at T1 in mm	21.583
3.	FPT - 273 = T2	313
4.	Vapour Pressure at T2 in mm	55.324
5.	VP (4-2) in mm as J	33.7
6.	831 mm – J = p2 in mm	797.4
7.	Gross Weight of sealed can in gm as L	495
8.	M in gm	(547.65 – 495) = 52.65
9.	v1 in ml	$\frac{52.65}{1.0565}$ = 49.384
10.	V1 - M1 expansion at FPT = v2 ml	44.134
11.	P1 mm	675
12.	760 - pl = Vacuum in mm & inches	85.35
13.	Vacuum in inches by vacuum gauge	4

T1 is RT, T2 is FPT, V2 as above, P2 (831 mm the flip puff pressure - the vapour pressure at RT as per reference to Hodgman.

Thus using GGL $p1 = \frac{p2 \times v2 \times T1}{T2 \times v1}$

Vacuum in the can is 760 mm - p1.

Conclusion:

It is evident from Table-II that both the methods of measurement compare well. The difference of about 1" in vacuum is due to the variation in the drained weight of the product. By estimating (1.) FPT (2.) Vacuum by vacuum gauge (3.) The expansion of covering liquid using the inverted burette methodology described (4.) The paste density of the fruit or vegetable and therefore estimating the (5.) Gross weight of fully filled container (6.) The vacuum can be calculated using GGL in any other can without puncturing it. Only in first can we need testing vacuum by puncturing the can. Also it is possible to determined the vacuum and density in the first can by referring to paper (Patwardhan).

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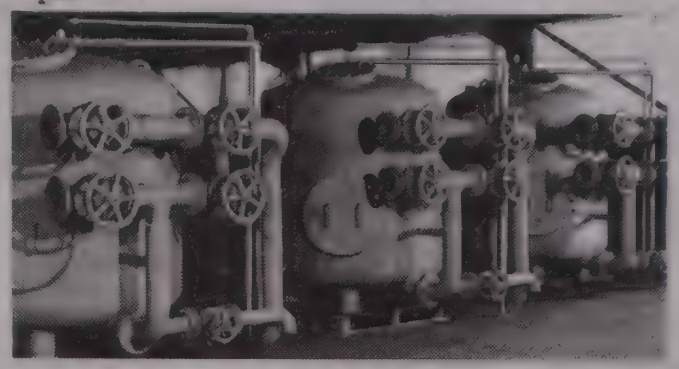

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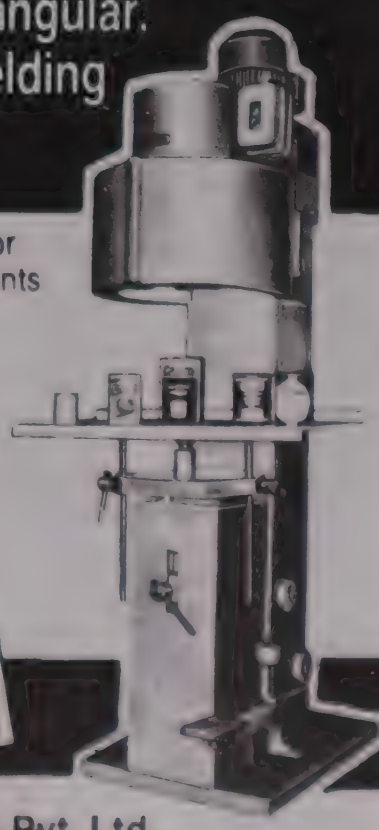

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Wine Preparation from Strawberry

by
Saravana Kumar, R.G. Manimegalai and M. Ilamaran

Abstract:
Wine was prepared from two varieties of strawberry fruits namely "Sujatha" and "Labella". The prepared wine was filled in bottles and stored for 3 months. Chemical composition of these wines such as TSS, acidity, pH and alcohol content were analysed before and after fermenting and after aging. The strawberry wines were organoleptically evaluated before and after aging (90 days) for various quality attributes such as colour, clarity, aroma, taste and overall acceptability.

Introduction:
The strawberry (*Fragaria* species) is one of the most important crops in India and in the world. Strawberry fruit is very delicate, reddish pink in colour with very strong fruity odour and mild sour in taste. The fruits have to be preserved while fresh or may be converted into products such as jams, jellies, squashes, nectars, RTS, concentrates, candies, bars, sauces and wines, marketed scientifically to fetch foreign exchange and to conserve the national economy (Swati Yamdagni, 1995). An attempt has been made to prepare wine using strawberry fruits and to study its acceptability.

Materials and Methods:
Strawberry varieties Sujatha (V_1) and Labella (V_2) were obtained from Maxworth Country (India) Limited, Kodaikanal (T.N.) Mature, sound and ripe fruits were selected, washed in clean water and surface dried. The calyx of the fruit was removed, pulped (mixie) and passed through hand pulper. Strawberry juice (500 g) was taken in a stainless steel vessel and sugar (160 g) was added to adjust the TSS to 22°Bx from 9°Bx (Sujatha) and 8°Bx (Labella). The pasteurization of fruit juice was done by keeping inside the water bath for 30 minutes at 60°C followed by immediate cooling. It was transferred to one litre flat bottom flask (glass) and the starter inoculam (*Saccharomyces cerevisiae var ellipsoides*) was added in the sterilized strawberry pulp to initiate the fermentation (10 percent V/V) which was carried out at 22±1°C and the must was allowed to ferment for 72hrs at 20±1°C.

The fermented strawberry juice (wine) was filtered through filter paper (4 folded thick paper) and poured into a sterilized bottle (cap. 680 ml) by leaving 1" head space and sealed. The bottles were pasteurized in the water bath for 30 minutes at 60°C followed by immediate cooling and then the wine was stored at 5 - 7°C for aging (3 months). The steps involved in the preparation of wine in given Fig. 1.

TSS (using hand refractometer), pH (Hart and Fischer, 1971), total acidity (Ranganna, 1977) and ethyl alcohol (AOAC, 1990) of the strawberry wine samples were analysed before and after ageing (3 months). The wine samples were organoleptically evaluated by 10 semi trained judges before and after ageing.

Results and Discussion:
The chemical composition and sensory analysis of strawberry wines before and after 3 months of aging are presented in Table 1 and 2. Before fermenting, the original TSS of the Sujatha and Labella strawberry fruit pulp were adjusted to 22°C Bx and their initial acidity and pH were noted as 0.45 and 0.30 g percent tartaric acid and 3.87 a 3.92 respectively.

Fig. 1. Flow Chart for the preparation of wine

Strawberry fruits
↓
Washing
↓
Removing Calyx
↓
Pulping
↓
Adding sugar to adjust 22° Bx
↓
Pasteurising for 15 minutes (60°C)
↓
Adding starter inoculam (10% v/v)
(Saccharomyces cerevisiae var. ellipsoideus)
↓
Fermenting for 72 hrs. (28±1°C)
↓
Filtering wine (4 folded thick filter paper)
↓
Filling in bottles and sealing
↓
Pasteurizing for 30 minutes (60°C)
↓
Cooling (immediately)
↓
Ageing for 3 months (5-7°C)

Table 1. Chemical composition of strawberry wines

Chemical Constituents	Before fermenting (musts)		After fermenting		After ageing	
	Sujatha	Labella	Sujatha	Labella	Sujatha	Labella
TSS (°Bx) (after adjusting)	22	22	0	0	0	0
Acidity (%)	0.45	0.30	0.01	0.09	0.15	0.15
pH	3.87	3.92	4.36	4.30	3.83	3.83
Alcohol (%)	0	0	6.00	6.00	8.50	3.50

Table 2. Sensory analysis of strawberry wines

Attributes	Before fermenting (musts)		After fermenting	
	Sujatha	Labella	Sujatha	Labella
Colour	Deep red	Dark pinkish red	Light brown	Light brown
Clarity	Medium cloudy	Medium cloudy	Clear	Clear
Aroma	Yeasty odour	Yeasty odour	Pleasant	Pleasant
Taste	Harsh	Harsh	Mild bitter	Mild bitter
Overall acceptability	Acceptable	Moderately acceptable	Highly acceptable	Acceptable
Scores values (%)	72.5	67.5	95.0	87.0

The acidity and pH of the wines before and after aging were noted as 0.01 and 0.09 and 0.15, 4.36 and 4.30 and 3.83 and 3.83 in wines prepared from Sujatha and Labella respectively. The fresh wine was free from residual sugar and had 6 percent alcohol content which changed to 8 5 percent after ageing. The percentage yield of wine ranged

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tween 70 and 60 for Sujatha and Labella respectively. nkataramu ***et al.,*** (1979) have fermented Bangalore blue apes containing 14.0 percent total sugars and produced ape wine with maximum alcohol content of 6.2 percent. lazuez ***et al.,*** (1991) produced grape wine containing 4 percent residual sugar and 6.4 percent ethanol by ng a specific yeast strains. Amerine and Cruess (1972) mented pear fruit juice fortified with cane sugar upto the mentable content of 21° Bx and obtained a good quality ne.

The strawberry wines were organoleptically evaluated fore and after ageing (90 days) for various quality attributes ch as colour, clarity, aroma, taste and overall acceptability. e fresh wine had an attractive colour (Pinkish red to dark d), cloudy body, yeasty odour and harsh in taste. During ing the colour had changed from highly acceptable to derately acceptable condition. After ageing the wine had ear body, pleasant aroma and slightly bitter taste. The erall acceptability score values had changed from 67.82 to .0 percent. Among the wines, the wine prepared from jatha was found to have high acceptability scores. Joshi ***et***, (1990) reported the wild apricot wine recorded higher core due to the balanced acid, alcohol and sugar taste, pealing colour and flavour. The wine prepared from custard ple was compared to that prepared from grape in terms of dy and taste to have high acceptability scores (Kotecha ***et***., 1995) The strawberry fruit was found to be suitable for the preparation of wine and it could be comparable with grape wine.

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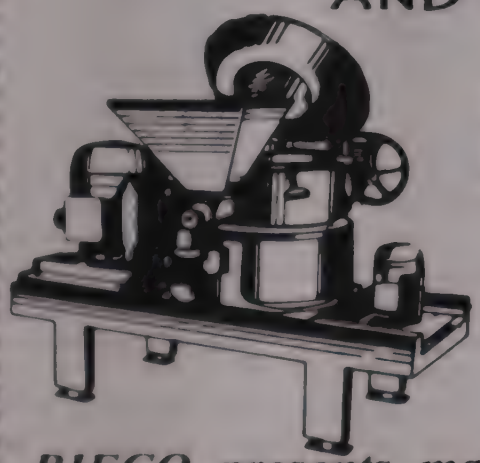
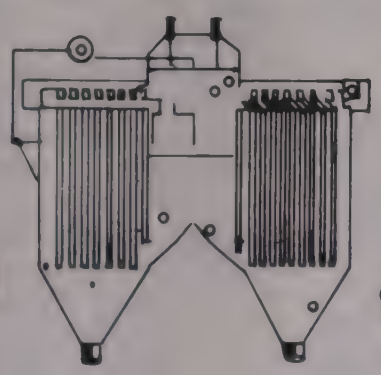
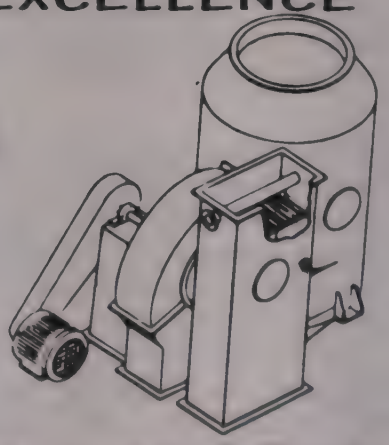

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Sweetners for Health Foods

by
Ronald C. Deis *, Ph.D

A food product's sweetness is usually one of its most important characteristics. It often distinguishes the product from its competition, and is often the number one property in terms of consumer acceptability along with overall flavor.

But when it comes to making product claims, not all sweeteners are created equal. Depending on the market, certain sweeteners are favored because of a different type of processing (or degree of processing) or because of their origin. Sometimes the selections make technical sense, sometimes not, but often sweetener use spreads by reputation. Some may argue that sucrose is sucrose, no matter what the source, but perception is key.

This means choosing sweeteners for the health market can be confusing, but it helps to pose several questions. Is the product marketed for weight loss, bodybuilding or general nutrition? Is it natural, kosher or organic? And is the food targeted for disease control or for general good health? Another consideration is whether the sweeteners introduced are nutritive or nonnutritive (Do they provide energy?). After that, product designers can consider sources of the sugars, whether as the saccharide alone, whether it comes from a certain source, such as fruits, vegetables, or grains or whether the sweetener is synthesized from something entirely different.

In spite of the process's complexity - or maybe because of it - when choosing sweeteners for today's health-conscious consumer, most of the bases are covered.

Sweet things:

Sucrose has historically been the primary sweetener source in processed products, followed by "other sugars," including glucose, fructose, lactose and maltose, and fruit pastes that derive sweetness from these molecules. Sweetening with sugars is accomplished to varying extents by including fruits, cereals, milk and flour (due to naturally occurring sugars), but more sweetness comes from fruit concentrates, honey, invert sugar, molasses and plant-derived syrups (corn syrup, rice syrup, maple syrup, etc.). All of these sugars are nutritionally the same - they are hydrolyzed to monosaccharides in the digestive system, providing energy.

Basically, nutritive sweeteners provide calories. In the past, we have always thought of carbohydrates as molecules that provide a standard 4.0 kcal per gram. This is true of sucrose, maltose, fructose, lactose, glucose, and related sugars. It also applies to most of the products derived from sugar processing - molasses, corn syrups, corn syrup solids, high fructose corn syrup, maltodextrin, and sugar mixtures.

Sugar bowl:

The product we identify as "sugar" (without the plural) is highly refined sucrose, obtained primarily from sugar cane or sugar beets, that has been clarified, decolorized and concentrated to 99.9% sucrose. Sugar is inexpensive and readily available in a range of forms - granulated, powdered and liquid.

Each of these general forms comes in a range of variations: granulated or powdered in different particle sizes, liquid inverted to various degrees and brown sugars of different hues. Granulated and powdered sugars are white, but washed raw-sugar crystals are available as white turbinado sugar consisting of more than 99% crose. Brown sugar consists of fine sugar crystals coa with various hues of molasses-flavored syrup. These numbered (6,8,10,13), with color and flavor levels incre ing with the number. Invert sugar in a non-crystalliz syrup made by hydrolyzing the disaccharide sucrose to monosaccharide constituents, fructose and glucose. finers also make liquid syrups that contain a range of 10 uninverted to completely inverted grades. Sucrose, rega less of origin, is considered "generally recognized as s (GRAS) (by the U.S. FDA) and, like most carbohydrat provides 4 kcal/gram.

In general, natural markets regard refined sucrose "too processed," this has opened another sugar indus targeted at these markets. Less-refined sugar appears labels as "unrefined sugar" or "evaporated cane juice These single-crystallization sugars differ in flavor pro and particle size, and include products such as milled ca sugar, Demerara and Muscovado. Milled cane sugar, wh includes some organic brands, is golden tan in color, w a slight molasses flavor. Demerara has a larger grain darker in color and definitely tastes of molasses. Mus vado is dark-brown and fine-grained with a heavy molass flavor. The natural market also carries dry mixtures sucrose and molasses. It is generally believed that the less processed alternatives provide more nutrition a trace minerals, and this varies according to the produc

Molasses, the concentrated liquid extract of the sug refining process, has been used since 325 B.C. in baki and confectionery products. Molasses can be extract from cane or beets, but foods primarily use sugar-can derived molasses. Domestic molasses (also known as r molasses) can be found in five different grades:

- Whole-juice molasses has been clarified and evap rated to 79.5% solids. This is relatively harsh flavor and dark in color
- First molasses comes from the first extraction sugar from the mother liquor and has a darker co than whole juice
- Second molasses is a by-product of second extra tion with a darker, stronger flavor
- Third molasses is a by-product of third extractio again darker and bitter
- Final molasses does not allow for additional sugar be extracted. This is the darkest and strongest flavor.

While the various types of liquid molasses all conta 79.5% solids, a dry form also can be found at 96% solid Final sugar in these products ranges from 53% to 74%, w 19% to 42% as invert sugar. Molasses, depending on t grade, supplies 70% to 100% of the sweeteness of s crose, as well as color, natural flavor or flavor enhanc ment, and additional calcium, iron, magnesium and pota sium. Other properties are humectancy, water-activ (Aw) control and antioxidant properties. Molasses also c be used to "paint" other sweeteners to produce a brow sugar without lumping.

Saccharides selections

Consumers accept fructose, a major component fruit pastes, as a natural product. Its relative swee ness compared to sucrose's 1.0 is 1.1 to 1.4, and it h

* *Director, Product and Process Development at SPI Polyols, Inc., New Castle, DE*

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sweetness synergies with sucrose. Fructose has a caloric value of 4 kcal/gram. It provides higher sweetness, so that less can be used to produce similar sweetness. Fructose's crystalline forms include granular or powdered, and it is made in liquid form as a component of high fructose corn syrup.

Fructose has a lower glycemic index (GI) value, a relative measure of the increase in plasma glucose following consumption. Consider the following values: glucose, 100; maltose, 105; sucrose, 60; and fructose, 20.

Since fructose is first absorbed in the small intestine, then transported to the liver for conversion to glucose, its initial uptake is insulin independent. Diabetics must manage their diet to maintain a normal blood glucose level - any increases in blood glucose will trigger an insulinemic response, creating an imbalance. This could lead to a serious insulin reaction or coma. Fructose does not cause a high initial glucose spike, keeping insulin at a normal level. High-fructose syrups at about 70% to 75% solids are composed of 42% fructose (52% dextrose) or 55% fructose (40% dextrose). Both are used extensively in the beverage and baking industries.

Other simple sugars to consider are dextrose and maltose. Maltose is less sweet but, as a disaccharide of dextrose, it provides more energy to the body during exercise (higher plasma glucose response) without increasing osmolality to the same degree as dextrose. As polymer size increases, various degrees of sweetening may also be obtained from corn syrup or corn syrup solids (26 DE to 63 DE) or from maltodextrins (0 DE to 20 DE). These would be classified as "sugars," with a caloric value of 4.0, but they provide inexpensive sources of carbohydrate energy and also serve as binders, bulking agents, humectants and Aw controls.

Polyols:

Another group of nutritive sweeteners are referred to as sugar alcohols, or polyols. The polyols are excluded from the term "sugars" on a food's ingredient legend, and are instead labelled as "sugar alcohols" at about 70% to 75% solids, according to Title 21 of the Code of Federal Regulations (CFR) 101.9 Sugar alcohols are slowly absorbed, primarily in the small intestine, resulting in a lowered caloric value as well as a lowered glycemic and insulinemic response.

The polyols include sorbitol, mannitol, xylitol, erythritol lactitol, isomalt, maltitol and liquid hydrogenated starch hydrolysates (HSH) and maltitol syrups. According to Peter Jamieson, Development Technologist, SPI Polyols, Inc., New Castle, DE, "Polyols are used extensively in the place of sucrose in sugar-free confectionery, chewing gum, baked goods, and dairy products. They are sugar-free, reduced-calorie, low-glycemic response and non-cariogenic. The FDA has allowed a health claim under Title 21 CFR 101.80 to note that sugar alcohols do not promote dental cavities. Xylitol is in fact anti-cariogenic, and is used extensively in oral care for that purpose."

HSH and maltitol syrups act as binders and humectants in many nutritional bars, and either maltitol and/or xylitol can be found in chocolates. Because they can be added to sugar-free products, the polyols are used in products for diabetics, but have also been recognized by athletes and physicians as a way to increase carbohydrates content with less of a caloric effect.

Other natural sweeteners:

Used in many "healthy" products for a variety of reasons, honey is a unique natural mixture of carbohydrates and other substances (38.2% fructose, 31.0% glucose, 17.1% water, 7.2% maltose, 4.2% trisaccharides and other highe carbohydrates, 1.5% sucrose, and 0.5% minerals, vitamin and enzymes according to USDA data.) Honey contain antioxidants, with higher levels in darker-coloured flora honey, and enzymes, such as invertase, amylase, glucos oxidase and catalase. Its color can range from water-whit to dark amber. The Aw of honey varies between 0.5 and 0. in the 40° to 100° F temperature range.

The National Honey Board, Longmont, CO, has pub lished information on use of honey in juice beverages an yogurt shakes. In these applications, honey enhance sugar and fruit sweetness, and decreases sourness an bitterness. The studies show that honey also can enhanc the growth of several Bifidobacterium species, establish ing it as a prebiotic. Natural products often use brown ric syrups because organic-certified syrups can be source easily, and syrups or syrup solids are obtainable from 2 DE to 70 DE. These syrups are produced from brown ric -rice is known for its hypoallergenic properties, as well a for its use in gluten-free products for those with celia disease. Rice-syrup applications are similar to those fo corn syrups, but they do cost more per pound than a equivalent corn product.

Malt syrups and extracts are GRAS ingredients derive from germinated barley that has been steeped, dried ground, extracted, filtered and evaporated to about 80% solids. These brown, sweet liquids may or may not contain diastatic enzymes. A range of products exists with various solids content, enzymatic activity, color, pH, reducing sugar level, protein and ash. Choice depends on formulation and finished product needs, such as high sweetness, a stickiness level that can be tolerated or desired binding characteristics. The saccharide profile ranges from about 1% to 2% fructose, 7% to 10% glucose, 1% to 3% sucrose, 39% to 42% maltose, 10% to 15% maltotriose and 25% to 30% higher saccharides.

Another sweetener, trehalose, was introduced in the United States in May 2000 by Cargill Inc., Minneapolis and Hayashibara Company Ltd., Japan. Trehalose, self-affirmed GRAS, is a disaccharide consisting of a, a-1,1-linked glucose molecule (maltose is a-1, 4-linked). It has 45% sweetness of sucrose (equivalent to maltose), is non-reducing with low hygroscopicity and fully caloric.

At the 2000 Calorie Control Technical Meeting in Newport Beach, CA, Arla Foods, Denmark, reported the commercialization of tagatose, also known as D-tagatose, a carbohydrate derived from whey. Research has indicated that caloric value is about 1.5 kcal per gram, and the product may have a lowered glycemic impact.

Fruit mixtures or concentrates also can sweeten healthful foods, ingredients such as dried plums, raisin-juice concentrate or cherry-juice concentrate. There are a large number of product sources, but care must be taken to find products with the proper mixture of sugars and other inherent components to provide the right flavor profile, Aw, viscosity and humectant properties.

Many fruit products - dry, concentrates, puree and juices - sweeten natural foods and other health-oriented products. Dried plums, for example, contain 8.1% total dietary fiber (mostly pectin), 16.5% sorbitol and 1.57% malic acid (great for flavor enhancement), according to the California Dried Plum Board, Pleasanton, CA. They also supply brown color, antimicrobials, binding properties, humectancy (sorbitol), as well as sweetness, which gives those looking for a cleaner label a more-natural option than ingredients with chemical-sounding names. Concentrates of raisin juice and cherry juice contribute color, sweetness, flavor and humectancy to health foods. Cherry-juice concentrate

is derived by evaporating tart cherries to 68° Brix. At this level of solids, it contains about 34% glucose and 20% fructose, plus natural anthocyanins and antioxidants. Raisin-juice concentrate, at 70% solids, contains 65% sugars, soluble fibers and antioxidants.

Another juice concentrate seen in some natural and organic products is agave nectar. This juice, obtained from blue agave, also is the source of tequila. However, this use conflicts with agave for sweetener use as far as supply; for both of these, source and quality is important. Agave nectar is sold at 75° Brix, and contains 92% fructose and 8% glucose, so the sweetness of the nectar is similar to that of fructose.

Non-nutritive sweeteners

The non-nutritive sweeteners, also referred to as non-caloric, are either inherently acaloric (zero calories), or are fully caloric with sweetness potencies so high that their extremely low usage levels have no significant impact on a product's final caloric content. They are indispensable in formulating sugar-free, reduced-calorie foods.

Along with the higher potency comes a higher price, but using these sweeteners at flavor-type levels dilutes the price impact. The non-caloric sweeteners are widely used for weight loss, diabetic products and carries prevention although natural-food stores don't generally favor them since they don't fit the "natural" image. The U.S. approved list includes aspartame, sucralose, acesulfame-K, saccharin, and elsewhere in the world, cyclamates, stevia, thaumatin, and alitame are used.

Saccharin was the first low-calorie sweetener used, and has been in use for more than 100 years. It is low in cost, claims 200 times the sweetness of sucrose and is acaloric. Saccharin currently is approved in more than 100 countries, but has been much maligned due to early studies showing bladder tumors in rats. Becuase of those studies, the FDA proposed a ban on its use in 1977 (withdrawn in 1991), but Congress imposed a moratorium on this ban effective through May 2002. Through the efforts of the Calorie Control Council, Atlanta, and other organizations, saccharin's support continually grows. In 2000 the National Toxicology Program delisted saccharin from its "9th Report on Carcinogens, "stating" studies now show that the rat bladder tumors arise from mechanisms that are not relevant to the human situation. In addition, we have decades more data from observations of humans using saccharin that adds to our confidence. In other words, with better science, we can now make a better call." After reviewing more than 30 human studies, the Joint Expert Committee on Food Additives (JECFA) doubled the Acceptable Daily Intake (ADI), stating, "adverse findings observed in male rats fed extremely high doses of sodium saccharin are not relevant to man." This led towards removing the restrictions and labeling disadvantages, which have hampered the U.S. saccharin use.

On Dec. 21, 2000, President Clinton signed the HHS Appropriations Bill (H.R. 4577), which contained the Saccharin Warning Elimination via Environmental Testing Employing Science and Technology - or "Sweetest" Act (H.R. 5668). This effectively removed the requirement for the saccharin warning label.

Cyclamate, a calorie-free sweetener discovered in 1937, is 30 to 50 times sweeter than sucrose. It is metabolized to a limited extent in some individuals, but generally is excreted unchanged. It comes in two forms - sodium cyclamate or calcium cyclamate - both of which exhibit stability to both high and low temperatures and has a pleasant, sweet taste profile.

Cyclamate is approved in more than 50 countries worldwide, including the EC. However, the United States banned cyclamate in 1970, and some countries restricted its use due to the development of bladder tumors in rats fed on the sweetener. But the result of this study has been called into question and the JECFA has determined that human cyclamate use is safe and has established a safe human consumption level. A petition for the re-approval of cyclamate is currently under review by the FDA. (In 1984, FDA's Cancer Assessment committee reviewed the scientific evidence and said the following: "the collective weight of the many experiments... indicates that cyclamate is not carcinogenic.")

Another, high-intensity sweetener, aspartame, is a dipeptide (methyl ester of aspartic acid and phenylalanine), and is actually fully caloric with 4.0 kcal/gram. However, it is 160 to 220 times sweeter than sucrose, these calories have no impact on the final product. Aspartame, after a rocky start due to the saccharin/cyclamate problems noted above, also benefited by these problems encountered by the other two sweeteners. In 1981, the FDA approved aspartame, with only a warning label advising phenylketonurics that the ingredient contained phenylalanine. It quickly became the most popular low-calorie sweetener and, after slowly gaining U.S. approvals step-by-step through categories, was approved in 1996 as a general-purpose sweetener. In addition to the United States, aspartame can be found in products throughout Eastern and Western Europe, Canada, South America, Australia and Japan.

Aspartame, now available from several suppliers, is used primarily in soft drinks, but food and beverage manufactures use the sweetener in thousands of other products. Aspartame, although a good all-purpose sweetener, does break down under high temperature, pH and moisture.

The NutraSweet Company, Mt. Prospect, IL, is also seeking approval of neotame, produced by the hydrogenation of aspartame and 3,3-dimethylbutyraldehyde (aldehyde). Like aspartame, this is a protein, but is 10,000 times sweeter than sucrose.

In 1988, the FDA approved acesulfame-K for chewing gum, dry mixes for beverages, instant coffee and tea, gelatin, puddings, non-dairy creamers and tabletop sweeteners. In 1998, this acaloric sweetener that is approximately 200 times sweeter than sucrose was approved for liquid beverages.

Acesulfame-K is approved for a variety of uses in approximately 90 countries, including the USA, the EC, Canada and Australia. The body doesn't metabolize this sweetener, the kidneys excrete it unchanged. It doesn't promote tooth decay and is suitable for formulating diabetic products.

The marketing of acesulfame-K was first to aggressively incorporate the multiple sweetener approach proposed for years by the Calorie Control Council. By itself, acesulfame-K has a bitter, metallic aftertaste, but it acts in synergy with other sweeteners, notably aspartame, and also remains stable at high temperatures. The high-potency sweeteners display different sweetness profiles in terms of time to maximum intensity and duration of sweetness. Many (including acesulfame-K and aspartame) complement each other in profile so that blends (about 1:1) produce more sweetness and an overall profile more similar to sucrose. The user's benefits are lower cost and better sweetness quality.

Sucralose was approved in 1988 in the United States (also approved in over 30 countries) as a tabletop sweetener and for use in desserts, confections and non-alcoholic beverages. Sucralose is derived from sucrose, is acaloric,

and is about 600 times sweeter than sucrose. The EC set an ADI of 15 mg/kg in September 2000. Sucralose has a very good sweetness profile, and is very stable in aqueous food systems. Sucralose seems to have gained some momentum within "natural-type" foods, and is on the Center for Science in the Public Interest's (CSPI) "acceptable" list. Again, perception is key, and the precursor for sucralose is sucrose, which lends it a more natural cachet than many of the other high-intensity sweeteners.

Thaumatin is an interesting sweetener extracted from katemfe fruit. Thaumatin (known commercially as Talin™) is a protein 2,000 to 2,500 times sweeter than sucrose, although with a delayed taste onset. It can produce a licorice-like aftertaste at high levels. It is heat-and acid-stable synergistic when combined with other high-potency sweeteners. It does not promote tooth decay and no adverse reactions have been observed in the animal and human studies conducted.

Thaumatin is authorized in the EC for use in foods as a sweetener, as a flavor enhancer in chewing gum, beverages and desserts, and in all applications as a "flavor preparation." The FDA has not approved it for use as a food sweetener. However, it has been approved by the Flavor & Extract Manufacturers' Association of the U.S. (FEMA) as a flavor enhancer at levels of 0.1 to 0.5 ppm. At these levels it enhances sweet and savory flavors, and masks bitter and metallic aftertastes. It has similar flavor-use approval elsewhere around the globe, including Canada, Japan and Australia.

Another sweetener of interest is stevioside. Steviosides are glycosides present in the stevia plant's leaves. Stevioside is appproximately 100 to 150 times sweeter than sugar, but also has a licorice-like aftertaste. Discovered in Paraguay, it is sold as a dietary supplement in the United States, but is not approved as a sweetener here or in Europe. In 1999, JECFA and the EC evaluated studies on the sweetener and determined it was unacceptable for use as a sweetener in food.

Science on Sugar:

Any sweetener - nutritive or non-nutritive-can be used in a "healthy" food. As mentioned before, the only restrictions are in the end use and in the "mind of the market."

While speaking at the Intertec Sweeteners 2000 Conference in Reston, VA, David Ropa, vice president, TJP Market Development, Madison, WI, stated that nutritive-sweetener consumption has increased 16% over the past two decades, half of that percentage within the past five years (these figures vary according to source). Part of this may be due to a change in the FDA's view of non-nutritive sweeteners. In 1980, the FDA stated that the use of non-nutritive sweeteners in confectionery was not for a functional purpose - their presence meant adulteration. In 1993, this was reversed, allowing their use in confectionery.

According to Ropa, the current market is torn between a view that nutritive sweeteners cause weight gain and a view that they do not cause weight gain. The former view increases the demand for non-nutritive sweeteners as well as encourages a move toward elimination of carbohydrates from the diet, or increasing protein vs. carbohydrates. The latter is supported by epidemiological studies that show an inverse relationship between sugar intake and obesity while a direct relationship exists between obesity and fat intake.

The USDA "Dietary Guidelines for Americans" now recommends the use of sugars in moderation. This reflects a much more relaxed view toward sugars, supported by a number of studies that generally fail to link sugars directly with disease. The one exception to this statement is their role in dental carries.

According to the International Food Information Council Foundation's (IFIC) 1995 IFIC Review on "Sweet Facts About Sugars and Health," studies support the view that sugars do not affect the mental performance or behaviour of children; they do not stimulate appetite in normal healthy adults or children, leading to obesity; they do not cause diabetes mellitus when consumed in moderation; and they do not cause coronary heart disease in normal individuals. This is the message that should be communicated to consumers.

Special market needs:

For diabetics, the American Diabetes Association no longer puts sugar off-limits, but does recommend moderation. (Diabetics must substitute sugar for other foods containing carbohydrates.) Alternative sweeteners can be a good choice for those targeting the market. The American Dietetic Association states. "Although it is recognized that carbohydrate sources provide different glycemic responses, the clinical perspective is that should be given first to the total amount of carbohydrate consumed rather than the source of the carbohydrate." Within this, dietetics practitioners can use both nutritive and non-nutritive sweeteners as part of the overall plan. Obesity is not the result of sugar consumption - overall caloric intake must be balanced with proper exercise. Reduced calorie and non-caloric sweeteners can certainly help in the overall plan by reducing total calories.

If the goal is cavity prevention, according to the American Dietetic Association, "use of polyol-based gum can reduce the risk of dental cavites compared to sucrose-sweetened gum, with the greatest benefit from xylitol-based gums." In fact, the FDA allows the health claim "does not promote tooth decay" if the sugar alcohol in the food is xylitol, sorbitol, mannitol, maltitol, isomalt, lactitol, hydrogenated starch hydrolysates, hydrogenated glucose syrup, erythritol, or a combination of these. The food also must be sugar-free (less than 0.5 grams of sugar per reference amount) and the food must not lower plaque pH less than 5.7 by bacterial fermentation during consumption or for up to 30 minutes as measured by in vivo testing. For sports products, the choice in sweeteners is dependent upon the goal. Should the product deliver quickly assimilated glucose (as in an energy beverage to be consumed during competition), or should this be delayed (as in a high-protein diet product which emphasizes insulin regulation)? Is carbohydrates loading the goal (as in pre-competition products), and what about calories? Does the sweetener need to act as a binder?

The product developer looking to design products for today's health-conscious consumer has a number of choices at their disposal. Choosing the right sweetening agent will lend to the overall success of a product, be it for weight loss, general nutrition or disease control.

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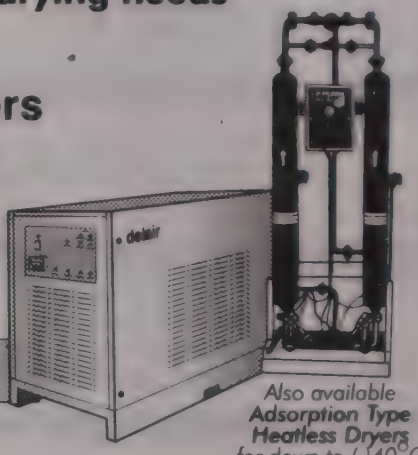

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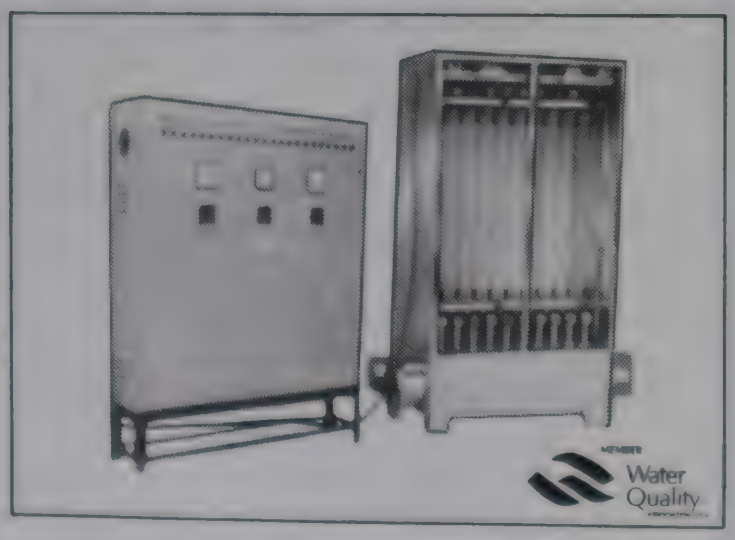

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Studies on Qualitative Aspects of Cashew Apple

by
S. Kannan and Susheela Thirumaran A

Abstract

Cashew apple varieties VRI-1, VRI-2, VRI-3 and VRI-4 were procured from the Regional Research Station, Vridhachalam, Tamil Nadu Agricultural University, Tamil Nadu. Among the four varieties, variation existed in various morphological and qualitative attributes. The chemical composition of apples also varied considerably. However, the acidity and pH of the juice did not vary significantly between the varieties. The present study clearly emphasized the possibility of selecting certain superior types of cashew apples suitable for processing of RTS, squash, jam, pickles and canning.

Introduction

Cashew apple (Anacardium occidentale L.) is one of the most important commercial plantation crops in India. It plays a significant role in earning foreign exchange through its nuts as well as cashewnut shell liquid. A total of Rs. 1230.20 crores was earned from the cashew exports which consisted of Rs. 1227.16 crores from cashew kernels and Rs. 3.40 crores from cashew nut shell liquid (CNSL) during 1995-96 (Pillai, 1996).

Cashew apple is enriched with sugars, minerals, and vitamins. It is one of the richest source of ascorbic acids, B complex and other vitamins. The juice has astringent taste due to the presence of tannins and anacardic acid which causes biting sensation on tongue and throat when the apple is eaten as such. Leucodelphinidin has been identified as the major polyphenolic constituent of cashew apple juice (Sastry ***et al.,*** 1962).

Ripe fruits yield more juice of better taste and flavour. The juice after removal of the astringent and acrid constituents can be used for preparation of variety of beverages like clarified juice, cloudy juice and juice blends with lime, orange, apple, and juice blends with edible products. The cashew apple is a fleshy peduncle and is a rich source, its highly nutritious juice can be utilized for the preparation of different fermented and non-fermented products viz, juice, syrup, jam candy, chutney, pickle, liquor, wine, vinegar etc., (Augustin, 1984). In the present study, some commercially important cultivars were evaluated for their extension of shelf life qualitative.

Materials and Methods

The present investigations were carried out in Home Science College and Research Institute, Tamil Nadu Agricultural University, Madurai, during the year 2000-2001. The experimental fruits selected were of different varieties. The cashew apple varieties VRI-1, VRI-2, VRI-3 and VRI-4 collected from the different varieties maintained at the Regional Research Station, Tamil Nadu Agricultural University, Vridhachalam were used for the study.

Representative samples of five well ripe apples were collected from each of the varieties and immediately brought to the laboratory in polytethene bags for studying the apple characters. The following characteristics of the apples were studied:

1. **Colour:** Colour of the apples was noted visually.
2. **Shape:** Shape of the apples was noted visually
3. **Weight:** The weight of apples was also recorded using a weighing balance.
4. **Size:** The length of apples and the diameter at central region were measured.
5. **Juice content:** Juice was extracted from apples of known weight and percentage of juice was thus calculated.
6. **Total soluble solids:** The percentage of total soluble solids was estimated by a hand Refractometer.
7. **Acidity:** The acidity of the juice was estimated by the method described by Ranganna (1995)
8. **Reducing sugar and total sugar:** Reducing sugar of the sample was determined by the procedure described by Ranganna (1995).
9. **Ascorbic acid:** The ascorbic acid content of the juice was calculated and expressed as mg/100gm as per the Ranganna (1995).

Result and Discussion

The colour and shape of apples, weight, length, diameter, percentage recovery of juice, total soluble solids, reducing sugar and ascorbic acid content of juice of the four varieties of cashew apple studied are presented in the Table 1. It is evident from the table that colour of the apples showed slight variations ranging from various shades of yellow to red. Shape of apples also varied considerably as cylindrical and conical. The variation in colour shape, weight and size of cashew apple has also been reported by Sondhi (1962).

The shape of apples has got significant relevance with regard to its suitability for processing of Ready To Serve beverage, squash and canning. Apples of conical shape

Table -1 Morphological and qualitative attributes of cashew apple (mean value)

Varieties	Colour	Shape	Weight (gm)	Length (cm)	Diam-eter (cm)	Perce-ntage of juice	pH	TSS °(brix)	Acidity (gm%)	Redu-sugar (gm%)	Total sugar (gm %)	Ascorbic acid (mg/100gm)
VRI-1	Yellow	Cylindrial	40.30	5.20	5.30	59.60	4.12	11.00	0.27	9.70	5.36	167.66
VRI-2	Yellow	Conical	44.90	6.50	5.80	53.80	3.46	12.00	0.35	8.30	4.53	174.66
VRI-3	Yellow shed red	Conical	40.90	5.60	4.80	56.90	3.43	9.16	0.31	9.36	5.66	171.65
CRI-4	Red	Cylindercal	41.90	4.90	4.90	59.50	3.76	10.33	0.32	7.43	5.65	172.33
C D. (.05%)	-	-	-	-	-	-	0.99^{NS}	0.77^{**}	0.08^{NS}	0.99^{**}	0.81^{**}	6.34^{**}

* - 0.5% Significant
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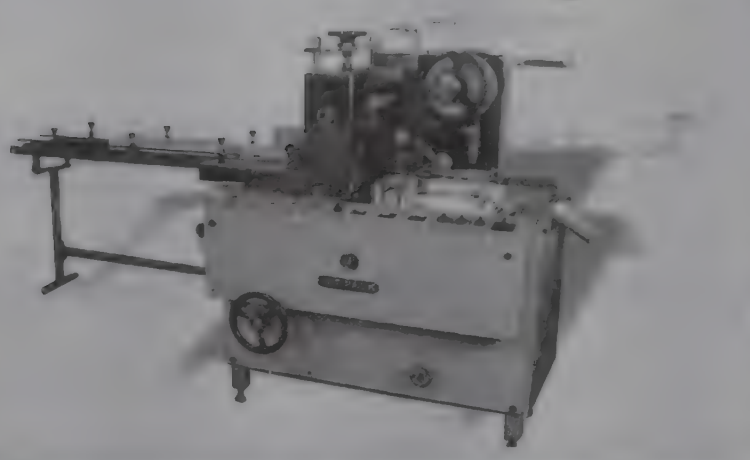

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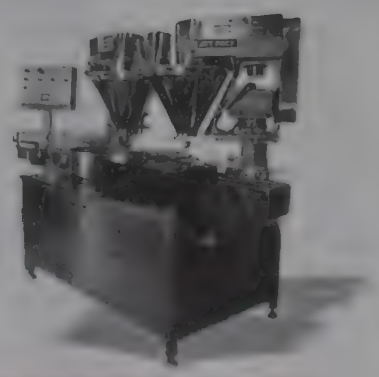

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are always preferred for processing of RTS, squash and canning as compared to apples of other shapes. Present investigation showed that apples of the varieties VRI-2 producing conical type fruits are most suitable for squash, RTS, jam, pickles and canning.

As far as the weight, length and diameter are concerned the variety VRI-2 ranked first followed by VRI-1. The variety VRI-2 produced apples of 44.90g weight, 6.5 cm length and 5.80cm diameter. Such variability in cashew apples between different varieties have also been observed by Vilasachandran (1978). The percentage recovery of juice ranged from 59.60 in the variety VRI-1 to 53.80 in the variety VRI-2. Jain (1951) also reported a juice recovery of 50-60 percent in cashew apple.

The present study clearly revealed that considerable variations existed in the quality attributes. Minimum variation was observed in ascorbic acid content of the juice. There was no significant variation in pH and acidity content of the juice between different varieties. However the variety VRI-2 showed a trend for high total soluble contents of 12.00 percent with maximum acidity of the juice (0.35 percent).

Among the four varieties studied, the variety VRI-2 topped the list with regard to reducing sugar contents of the juice while the variety VRI-4 recorded the least value of 7.43 percent. Studies at Central Food Technological Research Institute, Mysore, has shown that maximum sugar content and acidity of 0.27 to 0.35 percent in cashew are highly desirable for processing. From this point of view, the present study throws light that in cashew there is a possibility of getting superior types for processing. The ascorbic content of the juice also showed slight variation ranging from 167.66-174.66mg/100g. The variety VRI-2 recorded the highest value while the variety VRI-1 recorded the minimum. Vilaschandran (1978) also emphasized the variations existing in total soluble solids acidity, reducing sugar and ascorbic acid content of apple between the different cultivated varieties of cashew.

Summary

The present study was done in the Home Science College and Research Institute, Tamil Nadu Agricultural University, Madurai during 2000-2001 to find out the variation existed in various morphological and qualitative attributes of cashew apples of four selected varieties. Slight variations were noticed in colour, shape, size and weight of cashew apples. The chemical composition of apples also varied considerably. However, the acidity and pH of the juice did not vary significantly between the varieties. The present study clearly emphasizes the necessity of selecting certain superior types of cashew apple suitable for processing of RTS, squash, jam, pickle and canning.

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The EU and India — Facts and Figures on Trade in Agricultural Products

Absorbing a large part of its exports, the EU is India's most important trading partner. The EU is also the leading importer of agricultural products — a fact brought out in particular in its relationship with India. Over the last decade EU-India trade in agricultural products has more than doubled, resulting in a favourable trade balance for India.

Importance of agricultural in India

In many agricultural sectors, India is the world's leading or one of the largest producers. It is, for example, the second largest milk producing country in the world. Its agricultural sector is characterised by a high degree of product diversity. The complementary nature of a number of important Indian agricultural products, in comparison to those produced in the EU, offers India significant export opportunities to the EU market. Agricultural exports are very important for India and it has worldwide trade links.

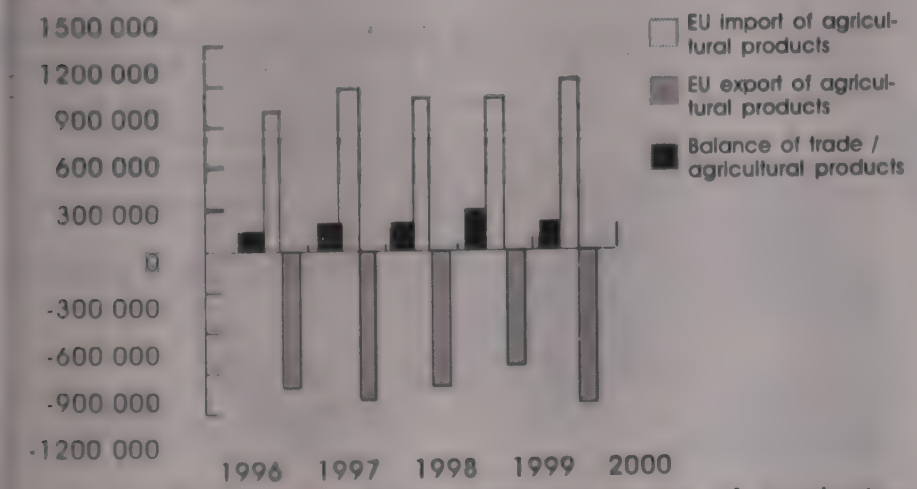
EU/India trade in agricultural products - 2000

Total trade in agricultural products between India and the EU is worth €1.4 billion, or 5.56% of total trade (almost 25.6 bio €). In 2000, the EU exported €152 million of agricultural products to India, and imported € 1.274 million of agricultural products, giving a deficit of €1.122 million. Such figures bear witness to the substantial market access provided by the EU to its trading partners such as India, which has seen strong growth in its exports to the EU in recent years (an increase of 23% compared to 1999, an increase of 10.5% for agricultural products).

Our top five imports from India are: coffee, tea, and spices (351 mio), fruit and nuts (228 mio), animal or vegetable fats and oils (134 mio), cereals and rice (99 mio) and lacs, gums, resins and other vegetable saps (77 mio).

Our top five exports to India are: animal or vegetable fats and oils (37 mio), beverages, spirits and vinegar (21 mio), oil seeds and oleaginous fruits (7.8 mio), by-products from the food industries (5.5 mio) and dairy produce, birds' eggs, honey (4.4 mio).

EU/India trade in agricultural products 1996-2000

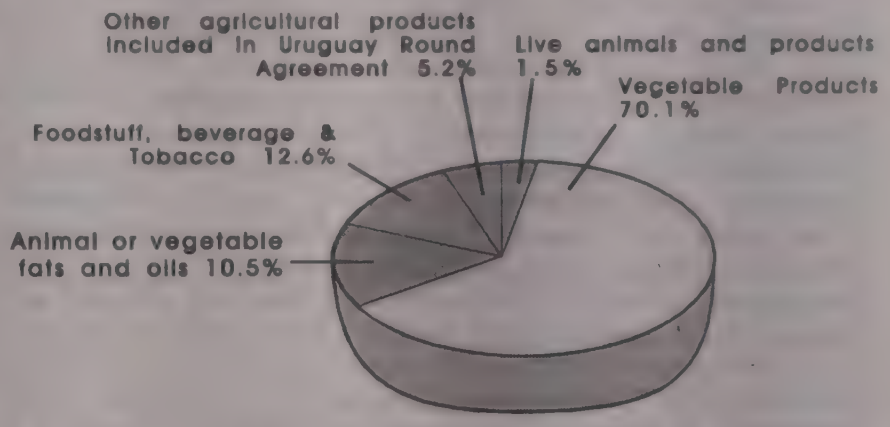


As to EU imports from India by group of products, vegetable products hold by far the leading position, with almost three quarters of the agricultural imports.

EU/India trade relations

The purpose of the WTO is to facilitate trade. This is because trade, imports as well as exports, create wealth and improve human welfare. India has an immense potential to increase its exports, and therefore to increase its wealth. However, this can only be realised in a more open trading system. For that reason, India and the developing countries in general should not miss this opportunity and should take part in further agricultural trade liberalisation within the WTO.

EU Imports from India by group of products (2000) in value


Other agricultural products included in Uruguay Round Agreement 5.2%
Live animals and products 1.5%
Vegetable Products 70.1%
Foodstuff, beverage & Tobacco 12.6%
Animal or vegetable fats and oils 10.5%

India and the EU both tabled comprehensive negotiating proposals in the context of the WTO negotiations. Although the approaches reflected in the proposals diverge on many key issues, there is a lot of common ground to focus on:

- Both India and the EU place a high priority on policies designed to foster rural development and addressed this issue in their respective proposals. The fact that rural development, as one of the so-called "non-trade concerns", is up for discussion in these negotiations is a sign of good co-operation and a proof of the spirit of goodwill in our trade relations.
- Article 20 of the WTO Agreement on Agriculture, which sets out the mandate for the agricultural negotiations, recognises the need for special and differential treatment of developing countries. In its comprehensive negotiating proposal, the EU has advanced a number of suggestions, many of which are of direct interest to India.
- The EU is sympathetic to India's needs and proposes that measures that promote the sustainable vitality of rural areas and the food security concerns of developing countries, as a means of poverty alleviation, be exempted from any future reduction commitments. The EU would also like to see that other ways be examined in order to provide the necessary flexibility to developing countries to address these concerns.
- As a part of a general policy to promote sustainable and economic development, the EU and all developed countries should intensify all forms of assistance to developing countries, in order to facilitate the implementation of the Uruguay Round results and making use of the appropriate WTO agreements.
- The EU is in favour of increasing market access for products originating in developing countries. Therefore it proposes that developed countries and the wealthiest developing countries provide significant, stable and predictable trade preferences to developing countries. This should allow further investment in and development of the agricultural and agri-food sectors in developing countries
- An important area of common interest is the protection of geographical indications for agricultural products. Both India and the EU have an interest in pushing for the establishment of a multilateral register of geographical indications.

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Physico-Chemical and Sensory Quality of Chicken Snack Developed from Broiler Spent Hen Meat and Corn Flour

by
V.P. Singh*, P.C. Dubey** & M.K. Sanyal**

Abstract:
Chicken snack was prepared using spent hen meat at 0 (control), 40 (I), 50 (II) and 60% (III) levels alongwith corn flour, sodium caseinate, spice mix, condiments, common salt, phosphate and baking powder. Level of meat, most significantly (P<0.01) influenced the contents of fat, protein, ash and carbohydrates as well as colour and appearance, flavour, texture, crispness, after taste and overall acceptability and significantly (P<0.05) influenced moisture content as well as pH of emulsion. Product II scored highest for colour and appearance, texture and overall acceptability while III scored highest for flavour, after-taste and meat flavour intensity (MFT) and I scored highest for crispness only. Addition of 60% meat in the formulation resulted in higher retention of moisture in III than others. Utilization of 50% meat is recommended for making a good quality chicken snack.

Introduction:
The phenomenal growth of snack food industry world-over during the past two decades has brought about a perceptible change in the consumption pattern of food items by the consumers as well as profitability of snack food industry (Jones ***et al.,*** 1981). Snack food can serve the purpose of health food, entertaining food, tasty food and ethnic cuisine of the consumers (Anon, 1998). These snacks are mostly made by extrusion process, have the ability to satisfy short term hunger and are available in the different forms and shapes such as chips, pretzels, crackers, fruit rolls, cookies, etc. (Tettweiler, 1991). The demand for snacks like fast foods are continuously increasing due to its nutritional value, reduced fat and sodium content and calorie product image (Shaw, 1990). This image can be further enhanced by the incorporation of milk solids, meat and its byproducts. Snacks are mainly prepared from cereal grains and sometimes supplemented with vegetable proteins (Falcone and Phillips, 1988 and Batistuti ***et al.,*** 1991). But such cereal based snack products lack some essential amino acids like tryptophan, threonine and lysine (Jean ***et al.,*** 1996). Chicken meat or beef incorporation into snacks enhances its nutritional value especially with respect to these amino acids, flavour and taste (Chen, 1989 and Park ***et al.,*** 1993b). Bhoyar ***et al.,*** (1998) reported that incorporation of milk co-precipitate in chicken based products improved nutritional and qualitative properties.

The phenomenal growth of poultry industry in our country resulted in about 3.5-fold increase in egg production to over 28 billions and a record 33-fold increase in broiler production to about 330 million between 1975 and 1995. With this rapid growth of broiler production, number of spent hens has also increased. Meat of these spent hens is considered as byproduct of commercial egg production or broiler production and poses problem for disposal (Baker ***et al.,*** 1968, Mahapatra, 1984). The meat of these birds a tough, less juicy and has poor functional properties. T products prepared from meat of spent hens have hi cooking loss due to high fat and poor water binding capac (Acton and Dick, 1978; Buyck ***et al.,*** 1982). The emulsif ing capacity of spent hen meat is inferior to broiler meat d to high connective tissue and less salt soluble protei (Hudspeth and May, 1969). Lower concentration of s soluble proteins in spent hen meat resulted in less emu sion stability (Hargus ***et al.,*** 1970). To overcome thes shortcomings, author advocates the use of binders a fillers such as corn and sodium caseinate in the produ formulation.

Materials and Methods:
Meat: Broiler spent hens (50 weeks old) were obtained fro Central Avian Research Institute (CARI), Izatnagar, dresse and deboned in the experimental abattoir of Livesto Products Technology (LPT) Division of Indian Veterina Research Institute (IVRI), Izatnagar for use in preparati of chicken snack (Table 1).

Table 1. Formulation for the development of chicken snacks

Items	Quantity (%, by weight)			
	I	II	III	Iv
Chicken meat	0	40	50	60
Sodium caseinate	2.5	2.5	2.5	2.5
Corn starch	91	51	41	31
Common salt	2	2	2	2
Condiments	2.5	2.5	2.5	2.5
Spice mix	1.5	1.5	1.5	1.5
Baking powder	0.5	0.5	0.5	0.5

Phosphate 0.3% w/w of meat used
Ice water 100% w/w of starch used

Sodium Caseinate, baking powder, common salt an corn flour: Baking powder (brand: Rex make: CP International Inc., New Jersey, USA), common salt (brand Tata, make: Tata Fine Chemicals, Mumbai) and corn flou were procured from the local market of Bareilly for use i chicken snacks while sodium caseinate was procured fro Central Drug House (P) Ltd., Mumbai.
Spice mix: Spice mix was prepared using the ingredient mentioned in Table 2.

Table 2. Composition of spice mix

Ingredients	Quantity (%, by weight)
Coriander powder	15
Cumin seeds	15
Red chilli powder	20
Black pepper	15
Cloves	5
Cardamom	5
Turmeric	10
Cinnamon	5
Aniseed	10

Condiment mixture: Condiment mixture was prepared b using fresh, peeled, sliced and ground onion, ginger an

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garlic in the ratio of 3:1:1 (by weight) to a fine paste with a small quantity of chilled water in a grinder (make: Belc Pvt. Ltd., New Delhi).

Method of preparation: Dressed and deboned meat of broiler spent hens was cut into small cubes and minced twice through the mincer (make: Electrolux, Sweden). Minced chicken meat was then blended with ice water (5% of calculated amount of water), common salts and phosphate and chopped in a bowl chopper (make: Seydelmann, Germany) for about 1 min. Condiment mixture was then added to the above prepared emulsion and chopped again for 30 sec. Sodium caseinate (make: Central Drug House Pvt. Ltd., Mumbai) was then added and rechopped for 1 min. Spice mix powder, corn flour and rest (95%) of the water were added to the mixture and chopped again for 1 min. The emulsion was extruded through a manually operated extruder in the shape of chips (20 cm × 2.5 cm × 0.3 cm). The chips were cooked in a microwave oven (make: Magi Cook, India) for about 8-10 min to prepare crisp snacks. Control snacks were prepared following the procedure mentioned earlier except that no spent hen meat was used in its preparation.

Analytical technique: The chicken snack and control snack were analysed for protein, fat, ash and moisture (AOAC, 1995), pH (Strange ***et al.,*** 1977) and shear force value (Smith ***et al.,*** 1991).

Sensory evaluation: Chicken snacks as well as control samples were subjected to sensory evaluation on the basis of 8-point hedonic scale (Keeton, 1983) by a panel of seven judges consisting of scientists from the Institute. The nature of the product was explained to the panelists without disclosing the identity of the samples and requested to record their preferences on an 8-point hedonic scale for different sensory attributes of snacks like colour and appearance, flavour, texture, crispness, aftertaste, meat flavour intensity as well as overall acceptability. In the hedonic scale, 8 denoted liked extremely while 1 indicated disliked extremely.

Statistical analysis: Data were analysed following the procedure of Snedecor and Cochran (1967).

Results and Discussion:

The pH and stability of emulsions have been given in Table 3 while the mean values of different physico-chemical and sensory parameters of chicken snacks made by utilising

Table 3. Effect of different levels of broiler spent hen meat on pH and stability of emulsion (Mean ± SE)*

Parameters	Level of meat (%, by weight)			
	0	40	50	60
Emulsion pH	6.42±0.10^{a}	6.29±0.06^{ab}	6.20±0.58^{b}	6.14±0.02^{b}
Emulsion stability	90.22±3.01^{a}	92.17±2.20^{a}	93.13±2.63^{a}	94.04±2.87^{a}

*Means with different superscripts row-wise differ significantly (P<0.05)

Table 4. Effect of different levels of broiler spent hen meat on phyciso-chemical properties of chicken snacks (Mean±SE)*

Parameters	Level of meat (%, by weight)			
	0	40	50	60
Yield (%)	90.90±2.66^{a}	88.75±1.92^{ab}	85.20±4.50^{ab}	80.15±4.08^{b}
Moisture (%)	6.65±0.44^{a}	7.47±0.34^{b}	7.89±0.09^{b}	8.15±0.11^{b}
Fat (%)	0.72±0.07^{a}	2.82±0.15^{b}	3.59±0.26^{bc}	4.00±0.53^{c}
Protein (%)	9.13±0.62^{a}	16.89±0.40^{b}	21.95±0.51^{c}	26.16±0.60^{d}
Ash(%)	1.60±0.10^{a}	2.41±0.29^{b}	2.80±0.08^{b}	3.41±0.24^{c}
Carbohy-drates (%)	81.90±0.42^{a}	70.41±0.66^{b}	63.77±0.29^{c}	58.29±1.20^{d}
Shear force value (Kg/cm^{2})	5.06±0.5^{a}	4.30±0.43^{a}	4.08±0.34^{a}	3.98±0.61^{a}
pH	6.39±0.20^{a}	6.25±0.08^{ab}	6.14±0.03^{ab}	6.00±0.03^{b}

*Means with different superscripts row-wise differ significantly (P<0.05)

Table 5. Effect of different levels of broiler spent hen meat on sensory characteristics of chicken snacks (Mean±SE)*

Sensory Attributes	Level of meat (%, by weight)			
	0	40	50	60
Colour & appearance	6.15±0.09^{a}	6.89±0.10^{bc}	7.05±0.08^{c}	6.72±0.07^{b}
Flavour	5.95±0.08^{a}	6.28±0.06^{b}	6.80±0.09^{c}	7.15±0.08^{d}
Texture	5.80±0.09^{a}	6.85±0.07^{b}	7.06±0.08^{b}	6.84±0.09^{b}
Crispness	5.70±0.07^{a}	6.88±0.09^{c}	6.70±.11^{bc}	6.47±0.07^{b}
After-taste	6.28±0.08^{a}	6.54±0.10^{b}	6.71±0.07^{b}	6.96±0.09^{c}
Meat flavour intensity	–	6.19±0.08^{a}	6.33±0.14^{a}	6.48±0.10^{a}
Overall acceptability	6.05±0.07^{a}	6.46±0.07^{b}	6.99±0.08^{c}	6.65±0.09^{b}

*Means with different superscripts row-wise differ significantly (P<0.05)

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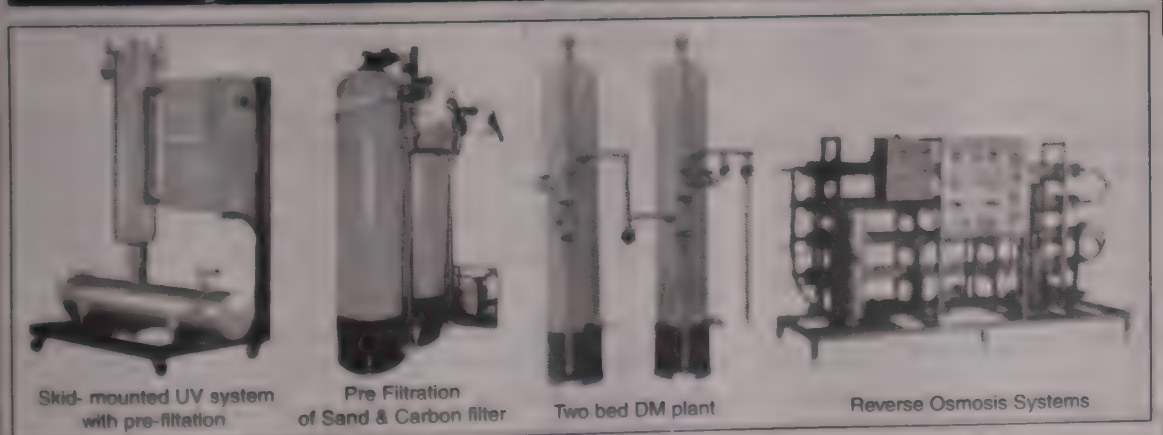

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different levels of meat from broiler spent hen alongwith sodium caseinate and corn flour are presented in Table 4 and 5, Anova indicated that pH of emulsion was significantly ($P<0.05$) affected by the levels of meat, while level of meat significantly ($P<0.05$) influenced moisture content and highly significantly ($P<0.01$) affected fat, protein, ash and carbohydrate contents of chicken snacks.

Emulsion pH and stability had an inverse and direct relationship respectively with the levels of meat. The average yield of chicken snacks was inversely related to the levels of meat and agree well with the findings of Smith ***et al.,*** (1991). This might be due to the decreased amount of total solids with decrease in the starch content in the mix. Yield of control differed significantly ($P<0.05$) from that of III only. Moisture content in the products indicated increasing trend with increase in level of meat and ranged between 6.65 to 8.15%. The increase in the levels of mechanically deboned chicken and decrease in the amount of corn flour in the extrudates might have resulted in increase in the moisture content in the extrudates (Alvarez ***et al.,*** 1990). The contents of fat, protein and ash in the chicken snacks were directly related while carbohydrate content was inversely related with the level of meat. These findings are well supported by the results of Jean ***et al.,*** (1996). The contents of fat and ash in I and III differed significantly ($P<0.05$) from each other while those in I and II did not show any significant difference in the products. Protein and carbohydrate contents of the products differed significantly ($P<0.05$) from each other.

Shear force value in the chicken snacks indicated decreasing trend with increase in meat level. It might be due to increase in moisture content in the treated products and better water binding capacity of meat. The lower shear force value normally indicated lower bulk density, higher expansion ratio and higher water absorption by the products (Park ***et al.,*** 1993a).

The average scores for all the sensory attributes of control samples were significantly ($P<0.05$) different from those of treated chicken snacks. The scores for colour and appearance of II significantly ($P<0.05$) differed from that of III but not from that of I. Treated products, however, differed significantly ($P<0.05$) from each other in respect of flavour scores, while non-significant difference in texture scores was noticed among treated products. The average scores for crispness and aftertaste showed decreasing and respectively increasing trend with increase in level of meat and ranged between 5.70 and 6.70 and 6.28 to 6.96, respectively. The scores for crispiness in I and II as well as II and III did not differ significantly but significantly ($P<0.05$) differed between I and III. A significantly ($P<0.05$) different score for aftertaste between II and III as well as between I and III was also observed. MFI score of the treated products did not differ significantly from each other in chicken snacks made by using different levels of meat. MFI in the products was directly related to the level of meat and overall acceptability of control sample was significantly ($P<0.05$) different from those of treated products. Among treated products, I and III showed nonsignificant difference while I and II as well as II and III were significantly ($P<0.05$) different from each other in respect of overall acceptability.

It is concluded that addition of spent hen meat improved physicochemical and sensory properties of chicken snacks as compared to that made without utilizing any meat. Chicken snack prepared by using 50% of meat obtained higher scores for colour and appearance, texture as well as overall acceptability as compared to control and other levels of meat. Use of 50% of spent hen meat is recommended for making a good quality chicken snack.

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Biochemical and Nutritional Studies of Sweet Potato Products

by
Pratibha Singh

Abstract:
The Sweet potato (Ipomoea batatas L.) tuber, an excellent starchy food of the poor is consumed after boiling, baking, roasting or frying. It can be processed into wide variety of products like chips, barries, sabe, phirni etc. This important root crop holds promise to processing industries and growers as well.

Introduction:
The sweet potato (Ipomoea batatas L.), is an important starchy food crop of the tropical and the subtropical continents, belonging to the family convolvulaceae. It has been used as food in tropical America and Polynesia since prehistoric times. In our country, the leading states in terms of area and production are Bihar, Orissa and Uttar Pradesh where sweet potato is a popular food among the poor.

Sweet potato is mainly used for human consumption. It is the cheapest source of calories (120 k cal/100g). The tender tops and leaves are utilized as vegetables in Africa, Indonesia and Philippines. Sweet potato and its vines also serve as good sources of fodder for livestock.

Materials and Methods:
The study covers two types of preparation - first preparation made with fresh sweet potato and in second, preparation of sweet potato flour products with different combinations. Flow chart for preparation of chips from sweet potato, barries, and sabe, phirni, sewain from sweet potato flour is displayed in Figure 1 & 2.

Results and Discussion:
Physio-chemical properties are presented in Table 1 & 2.

Quality of tubers is mostly dependent on its sugar content. Sweet potato tuber contains appreciable amount of minerals and vitamin, namely a, b and c.

In most parts of the tropics, tubers are consumed after boiling, baking, roasting or frying. However, it can also be processed into many other products like chips, barries, sabe and phirni.

Table 1: Physical properties of fresh sweet potato.

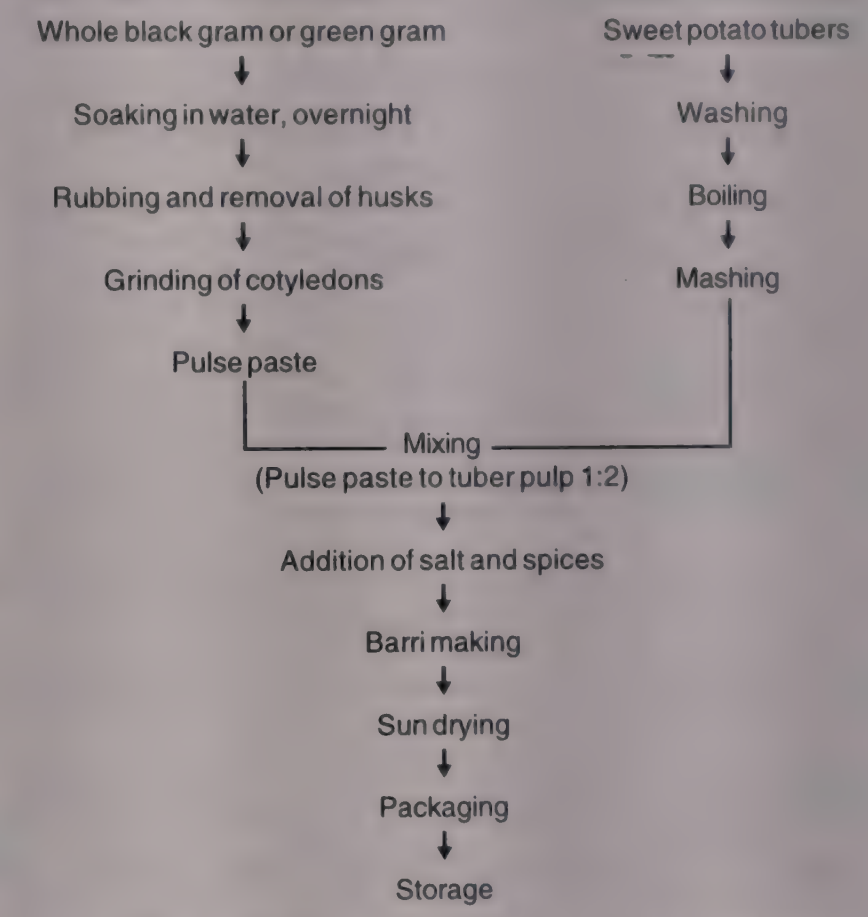
Physical Character	Range
Tuber weight (g)	90-200
Tuber length (cm)	17-23
Tuber diameter (cm)	3-4
Edible portion (%)	96-97
Non edible portion (%)	3-4
Tuber colour -	Pale white and purple

Table 2: Chemical composition of tubers.

Particulars	Per cent chemical content
Moisture	69
Protein	1.15
Fat	0.32
Carbohydrates	27.98
Crude fibre	0.50
Reducing sugar	1.46
Non reducing sugar	2.29
Total sugar	3.75
Vitamin C (mg/100g)	25.29
Total minerals	1.05

Assistant Professor (Human Nutrition), Department of Food Technology, N. D. University of Agriculture & Technology, Kumarganj, Faizabad-224 229 (U.P.).

Fresh sweet potato tubers: Fresh sweet potato tubers are to be utilized for the preparation of two products i.e. chips and barries (Flow sheet 1).



Flow sheet 1: Preparation of barries from sweet potato tubers.

Chips: Fresh sweet potato tubers after thorough washing and peeling are cut into chips with the help of a slicing machine. They are washed and immersed in 0.05 per cent solution of sodium chloride to prevent the enzymic browning. Thereafter, they are subjected to sundrying. The dried chips are stored in polyethylene bags and served after deep frying in vegetable oil whenever required. Spices and salt may also be sprinkled on the fried products. One hundred gram fried chips contains about 6% protein, 55% carbohydrates, 2.8% minerals, 24% fat and 464 Kcalories energy.

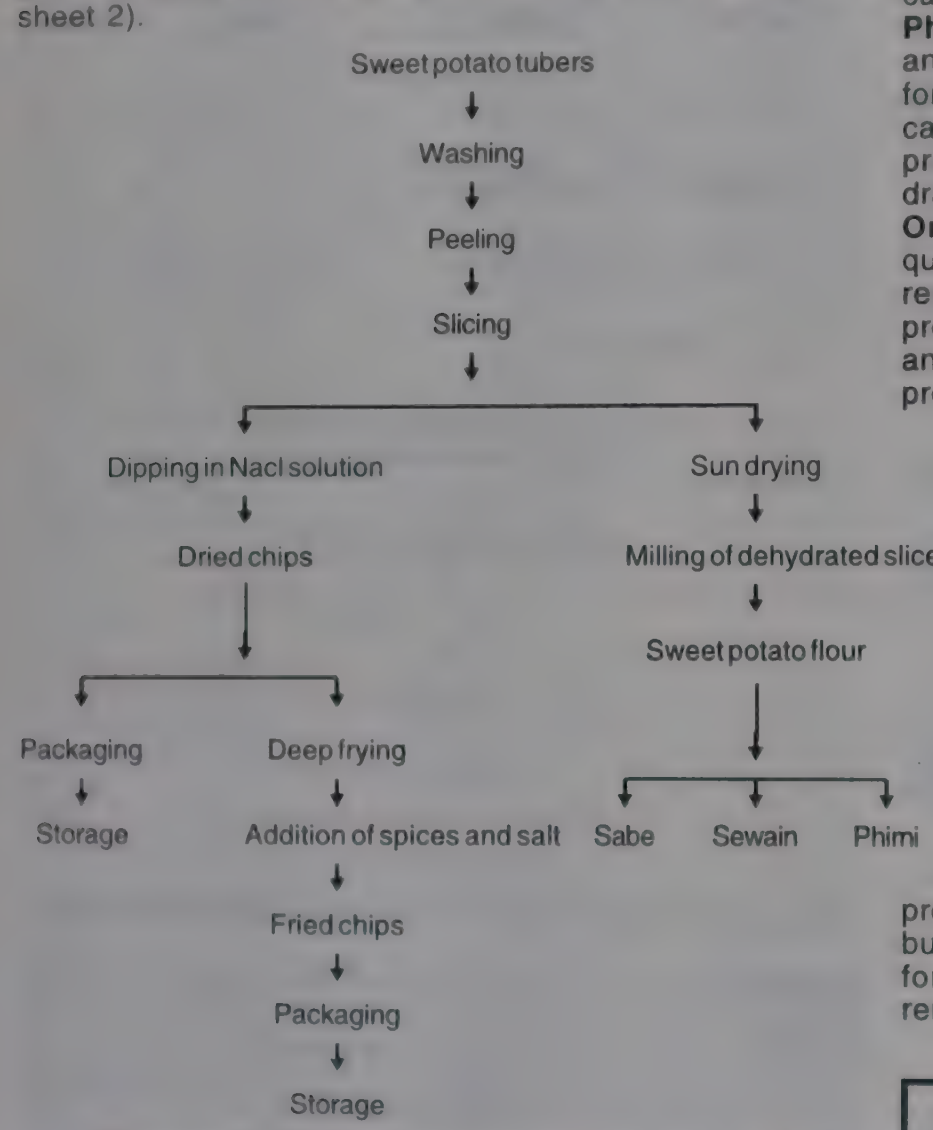
Barries: Black gram is cleaned, washed and soaked overnight in water approximately three times their weight. Husk are removed by rubbing the grains between palms. Cotyledons are ground to form fine paste. Tubers after proper washing, boiling and then peeling are mashed. Barries mixture is prepared by mixing pulse paste with tuber pulp in a ratio of 1:2 along with the spice mix as desired. Ten to fifteen gram of mix is used to form small balls which are sun dried to obtain the barries. Green gram may also be used in place of black gram for the preparation of barries. The finished products possess about 15%

protein, 50% carbohydrates, 3.3% fat, 3.2% minerals, 2.8% minerals and 290 Kcalories energy.

Table 3: Protein, carbohydrate, fat, energy and total mineral content of fresh sweet potato products.

Products	Ratio (%)	Protein (%)	Carbohydrate (%)	Fat (%)	Energy (%)	Minerals (K. Cal.)
1. Chips fried		5.69	55.04	24.62	464.50	2.76
2. Barries (Sweet potato +Black gram)	2:1	14.65	50.69	3.29	290.97	3.20
C.D. at 5%		0.04	4.36	5.28	3.59	0.03

Sweet potato flour: Fresh tubers after thorough washing and peeling are chopped into slices. They are dried in sun and the dehydrated chips are milled to form flour (Flow sheet 2).



Flow sheet 2. Preparation of sweet potato chips and flour

Table 4: Protein, carbohydrate, fat, energy and total mineral content of sweet potato flour products.

Products	Ratio (%)	protein (%)	Carbohydrate (%)	Fat (%)	Energy (%)	Minerals (K. Cal.)
1. Sewain cooked		5.3	54.03	28.61	494.81	2.71
2. Sabe (SPF+ Gram flour)	2:1	12.04	47.54	29.24	501.36	2.97
3. Phimi (SPF+ Soy milk)	2:10	8.25	60.97	1.19	303.35	2.70
C.D. at 5%		0.28	2.48	0.03	4.05	0.08

SPF:- Sweet potato flour

It can be used for preparing products like sewain, sab and phirni.

Sewain: Sweet potato flour is kneaded with minimu amount of water to form tight dough which is used t prepare sewain with the help of a sewain making machine Sewains are sun dried and then packed in a polyethylen bag. These sewains are cooked as usual before th serving. Cooked sewains contains about 5% protein, 54% carbohydrates, 28.6% fat, 2.7% minerals and 495 kcalorie energy.

Sabe: A mixture of sweet potato flour and besan (Gra flour) in a ratio of 2:1 is kneaded with minimum amount o water alongwith salt and red chilli powder to form tigh dough. Sabes are prepared by extruding dough through sabe making machine and they are deep fried directly in th vegetable oil. Fried sabe contains about 12% protein, 48% carbohydrates, 29.2% minerals and 501 kcalories energy

Phirni: A mixture of 200g sweet potato flour, 1000 ml mil and 200g sugar is cooked to the desired consistency t form phirni. It is served after cooling. Elaichi and kismis can also be added. A serving of one hundred gram finishe product possesses about 8.3% protein, 61% carbohydrates, 1.2% minerals and 303 kcalories energy.

Organoleptic quality: Data is recorded on organolepti quality by employing nine point Hedonic Rating Test. Th results of organoleptic quality of various sweet potat products are given in Table 5. Phirni prepared with Soy mil and cooked sewain have scored highest among the variou products of sweet potato.

Table 5: Organoleptic quality of sweet potato products.

Products	Ratio	Organoleptic quality	
		Score	Rating
Chips fried		8.0	Like very much
Barries (Sweet potato +black gram)	2:1	7.0	Like moderately
Sewain cooked		8.2	Like very much
Sabe (SPF+gram flour)	2:1	7.3	Like moderately
Phirni (SPF++soy milk)	2:1	8.2	Like very much

SPF: Sweet potato flour

Thus sweet potato is an excellent raw material for th preparation of a wide variety of products. This importan but neglected root crop holds a promise for a bright future for the processing industry which would also provide remunerative prices to the growers.

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Tomato-based Foods may reduce lung cancer caused by ozone

Tomato-based foods and tomatoes may reduce risk of damage to the lungs caused by ozone, according to new preliminary findings from research presented at an international scientific symposium ``On the Role of Tomato Products in Carotenoids and Disease Prevention.'' This study and others presented at the symposium, sponsored by the American Health Foundation, point to a variety of new potential benefits from consumption of tomato-based foods including possible protection against age-related macular degeneration, cataracts and other diseases of the eye.

``The latest findings on the benefits of tomato carotenoids, including lycopene, suggest that they may play a role in lung and vision function in healthy people,'' says Daniel Nixon, MD, president of the American Health Foundation, and director of the Foundation's Cancer Center. ``Other studies presented further add to our understanding of the benefits that tomato-based foods may have for protection against cancers in specific organs, such as the prostate and lungs, and more recently to a decreased risk of cardiovascular disease.''

The health benefits of tomato products and lycopene, a carotenoid in tomatoes and the pigment that gives tomatoes their red color, first came to light in 1995 when a Harvard study showed that a reduced risk of prostate cancer was apparent in men who consumed a diet rich in tomato products.

New Research Findings

Reduced Risk of Ozone-Related Lung Damage

A pilot study conducted at the Environmental Protection Agency in Chapel Hill, NC, by Drs. Lenore Arab and Michael Madden, University of North Carolina at Chapel Hill, James Samet and colleagues at the US Environmental Protection Agency, Susan Steck-Scott, National Cancer Institute, showed a 12 percent increase in lung lycopene levels and a 20 percent decrease in oxidative damage to DNA in lung cells within two weeks time among individuals who consumed 12-ounce servings of vegetable juice cocktail in addition to supplement vitamins C and E. The results are based on 23 healthy adults who were exposed to ozone for two hours following two weeks of antioxidant intake, which included one can of V-8 vegetable juice daily or a placebo. Oxidative stress to the lungs is associated with high levels of ozone in the atmosphere, one of the damaging impacts of air pollution.

``This evidence indicates that lycopene and other carotenoids found in processed tomato products may protect the lungs against oxidative damage. This might impact the functionality of the lung. A number of observational epidemiologic studies have also shown potential protective effects of these types of diets on lung cancer risk,'' states Dr. Arab.

Protection Against Eye Disorders

Frederick Khachik, Ph.D., University of Maryland, College Park presented new information that, while preliminary, suggests that carotenoids, particularly lycopene, may protect the eye against oxidative damage and thereby plays a critical role in visual function. Dr. Khachik's research review builds on the well established knowledge that lutein and zeaxanthin are the two main dietary carotenoids in ocular tissues and may provide protection against age-related mascular degeneration (AMD), the leading cause of blindness in those 65 and older.

The identification of lycopene and a diverse range of dietary carotenoids in ocular tissues by Dr. Khachik suggests that these carotenoids as well as other nutrients found in tomato-based foods may work in concert with lutein and zeaxanthin to provide protection against AMD and other visual disorders. Lycopene is found in high concentrations in ocular tissues, with the exception of neural retina and the lens.

Also during the symposium, scientists discussed research showing that the cooking and processing of tomato products makes lycopene more readily available to the body, indicating that there may be an added health benefit to eating processed tomato foods like tomato soup, pasta sauce and vegetable juices. Steven K. Clinton, M.D., Ph.D., The Ohio State University, found that standard daily servings of tomato sauce, tomato soup, and V8 vegetable juice were each effective interventions to significantly increase blood concentrations of lycopene. Lycopene levels increased among study participants by 192% (pasta sauce), 122% (soup), and 92% (vegetable juice) respectively, and plateaued at a new baseline after only 14 days of consumption.

In addition, a review of two studies in Finland indicates that when diets are lacking in tomato products, the resulting low levels of blood lycopene significantly increases the risk for heart attack and stroke and early atherosclerosis among middle aged men. These studies support the contention that increased lycopene intake in men may play a protective role in cardiovascular disease, especially in early stages of atherogenesis.

``Lycopene co-exists with other carotenoids in tomato products, and the naturally occurring mixture may be superior in preventive effects to purified chemical lycopene,'' explains David Heber, MD, Ph.D., Director of the UCLA Center for Human Nutrition. ``Based on the research, I would recommend that men and women interested in reducing their risk of cancer eat at least five (5) servings of tomato-based foods per week. As little as eight ounces of tomato-based vegetable juice, an eight-ounce serving of tomato soup or a half-cup of tomato sauce have been shown to help elevate blood levels of lycopene in only two weeks.''

The International Symposium, sponsored by the American Health Foundation with an educational grant from the Campbell Soup Company, was held to discuss emerging research on the role tomato products play in human health, including heart disease and cancer prevention. Thirteen noted physicians and researchers from around the world presented their latest findings during the session. The American Health Foundation is the nation's foremost preventive medicine research facility and a pioneer in research directed toward understanding the critical role of nutrition in preventing cancer development.

***Source:** American Health Foundation; Campbell Soup Company*

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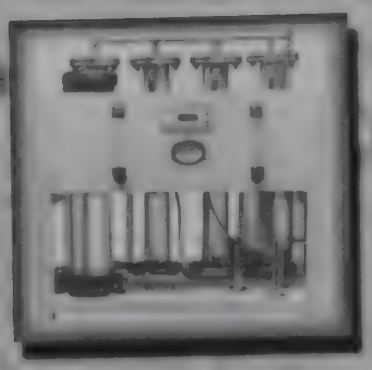

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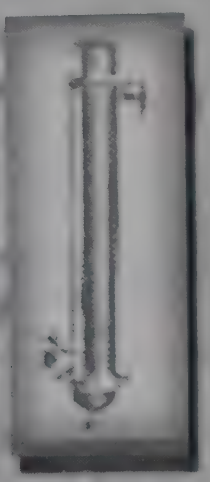

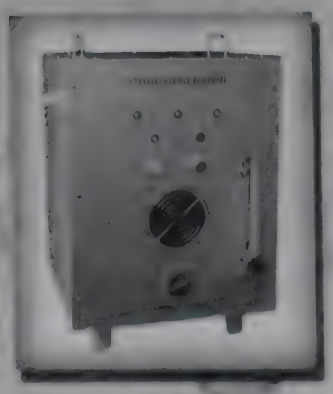

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NEWS & NOTES

ICECREAMS MARKETS

In a bid to bring the bounce back in a sluggish market growing at 10 percent per annum, ice cream players in the Rs 400 crore organised sector are busy sprucing up strategies to grow the market and improve sales. The efforts basically include launching products in the lower-priced range and broadening the consumer base.

The aim is to make branded ice creams a product of mass consumption.

Gujarat-based Dairy Den, for instance, has recently launched its Yums brand of Softy in the Northern region.

Dairy Den's Yums Softies are available for Rs. 5. Kwality Walls, the multinational ice cream brand from the Hindustan Lever stable, also launched a whole range of products in the lower-priced segment recently. It has introduced a Softy priced at Rs 5. In fact, the company has plans to set up 1,000 Softy kiosks across the country.

Much like Kwality, Dairy Den too has plans to set up 700 Yums outlets across the country beginning in the west and north and then moving to the southern states. Dairy Den will also invest approximately Rs 25 crore in opening 25 Dairy Den CTF ice cream parlours in Maharashtra and Delhi soon.

Meanwhile, Gujarat Cooperative Milk Marketing Federation Ltd. (GCMMF) claims that its Amul brand has grown by over 50 percent in 2000-01. R.S. Sodhi, marketing manager at GCMMF insists that the industry growth rate is 20%.

Amul, too, will be launching its Softy range (available in seven flavours) in different regions. The product, launched in Gujarat a few months back, will now be launched in Mumbai for Rs 5. Amul also plans to set up Amul fast food outlets in some cities in Gujarat which will serve ice creams apart form other fast food items.

Meanwhile, Delhi's market leader National Dairy Development Board's Mother Dairy also has plans to take its ice cream to other states.

INVESTMENT IN PROCESSED FOOD SECTOR

Government officials are quoted as saying that lack of rural infrastructure is a big road block due to which investors, domestic and multinationals, are reluctant to invest large amounts in the processed food sector.

According to official estimates, after the liberalisation of the food processing sector in July 1991, investment till December 2000 has been to the tune of Rs 73,220 crore only. Moreover, the share of foreign direct investment (FDI) in this sector has been around Rs 10,992 crore only.

Estimates show that there has been a Rs 384-crore increase in the total investment from December 1999 to December 2000.

But, surprisingly, the foreign direct investment inflows has been pegged higher by Rs 1,892 crore at Rs 10,992 crore from Rs 9,100 crore in December 1999, DP Tripathi, secretary, department of food processing industries said. "Investment especially large ones, cannot come in until there is a proper rural infrastructure like roads and electricity. These facilities are very essential since all the raw materials - fruits and vegetables - are grown in rural areas and they need good roads for transportation and electricity for development of cold storages and processing."

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COW DUNG POWERS CALIFORNIA DAIRY

Cow dung kept the lights burning in parts of California during the recent energy crisis. Mr. Lea Langerwerf's cows churn out enough manure to run a specialized power plant that can light 40 homes.

Altogether, 1,000 small power producers combine to generate a third of the state's energy, burning sawdust and walnut shells — among other things — to generates electricity. But nothing quite matches the initiative of Mr. Langerwerf. The dairy farmer, who has about 700 cows, installed a device called a Methane Digester in 1982 and now powers his dairy with cow dung. The plant saves $40,000 a year in water and power bills for the dairy in the Sacramento Valley, and also produces 20,000 kilowatt-hours a month that Mr. Langerwerf sells on

WATER – A SAVIOUR

'Water' is a saviour for numerous soft drinks company as the growth of carbonated drinks have slowed down

The carbonated drinks market grew by a mere 4 percent in May and indus-

try sources said they did not see growth going beyond 5-6 percent for the entire year, compared to a volume growth of 12 percent earlier. But the companies expect to make up with growth rate figures for the entire industry – carbonated drinks as well as water – which is at around 10 percent. This is because water market volumes are expected to grow by a staggering 40 percent this year. The total turnover of the water market is already Rs 600 crore.

Says a Pepsi spokesperson, "Yes, growth of the water segment has been really good, especially with the unusual rains coming as a dampener to carbonated drink sales." A Coca Cola spokesperson also admitted that sales of soft drinks were hit due to the unusual rains.

In urban markets water is replacing carbonated drinks as a thirst quencher. Soft drinks are now seen more as a lifestyle product or something which is consumed at home. With bottled water as easily available as carbonated drinks, and with it being a cheaper product (Rs 5 for 500 ml), demand and a shift is already happening. Consumers have become more health conscious and are shifting towards more healthier options such as fruit juices, non-aerated soft drinks, milk products and even water. Water is light and more natural. Aerated drinks are not natural, have additives which includes oil extracts which are not considered healthy. Besides, water is the best thirst quencher and comes cheaper. The global trend shows water being preferred over soft drinks and soft drinks firms are entering new healthier product categories.

APPLICATIONS INVITED FOR NATIONAL AWARD FOR R&D EFFORTS IN INDUSTRY 2001

The Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, Government of India has invited applications from all industries, irrespective of DSIR recognition, for National in-house R&D awards (2001). The award is for outstanding R&D achievements for the Agro and Food Processing as well as other industries.

Eligibility: All units of Indian industry, which are registered in India as limited companies, private limited companies, partnership/proprietorship concerns and who are engaged in R&D activities (irrespective of their recognition status with DSIR).

Last date for the receipt of application is June 30, 2001. Application proforma along with guidelines are available at the DSIR Website: http://www.dsir.nic.in. 15 sets of the application as per prescribed proforma along with one page crisp summary of all aspects should be covered in the application, for consideration. The duly filled in applications may be submitted to the Scientist-G and Head (RDI), Department of Scientific and Industrial Research, Technology Bhavan, New Mehrauli Road, New Delhi 110016.

FOOD PROCESSING PARK

Kerala has established a Food Processing Park near Calicut. Said to be the first of its kind in the country, the Park, set up by the Kerala Industrial Infrastructure Development Corporation (Kinfra), is fully dedicated to food processing. The Park offers state-of-the-art facilities at a competitive price. The Park will have a dedicated water and electricity supply system, common effluent treatment plant, common facility centre including conference facilities and advanced communication facilities. The Park, inter alia, will have a sophisticated laboratory to provide not only food testing facilities conforming to international standards but also research and development facilities.

The United Nations Industrial Development Organisation is extending technical assistance to the project aiming at capacity building in quality management and environment management. One of the major areas of assistance will be in establishing internationally acceptable quality systems in the industrial units coming up in the Park. Besides, the UNIDO will train the industry in sound environmental management techniques.

Vatis Update; Food Processing, May-June 2001

NEW AND REVISED INDIAN STANDARDS

Following are some of the new and revised standards on'Food and Agriculture' issued by the standards authority in India.

IS 5718: 2000 Agricultural produce processing equipment – Seed cleaners – Test code (second revision), Gr 6.

IS 14806: 2000 *Azospirillum* inoculants, Gr 3.

IS 14807: 2000 Phosphate solubilizing bacterial inoculant (PSBI) – Specification, Gr 2.

IS 14826: 2000 Animal feeding stuff – Determination of ash insoluble in hydrochloric acid, Gr 2.

IS 14827: 2000 Animal feeding stuff – Determination of crude ash, insoluble in hydrochloric acid, Gr 1.

IS 14831: 2000 Animal feeding stuff – Preparation of test sample, Gr 4.

IS 14832: 2000 animal feeding stuff – Determination of urea, Gr 2.

IS 14833: 2000 Lindane wettable powder – Specification, Gr 2.

IS 14834: 2000 Lindane dusting powder – Specification, Gr 3.

IS 14855 (Part 1): 2000 Plant protection and vector control equipment – Fogging Machine – Specification: Part 1 Pulse-jet-type thermal fogger, Gr 8.

IS 14857: 2000 Method for determination of 2,4-D Residues in agricultural and food commodities, Gr 2.

IS 3481: 1966 Specification for β-carotene, food grade, Gr 3 (bilingual – Hindi and English).

Standards India Ltd., Vol. 14, No.9, Dec. 2000

AMENDMENTS TO PFA RULES FOR DAIRY AND CEREAL PRODUCTS

The government has amended with immediate effect the provisions under Prevention of Food Adulteration Rules (PFA) 1955 relating to standards for some dairy products and for atta, maida and barley powder.

The notification spells out the limits for preservatives like sorbic acid and nisin in cheese and processed cheese harmonising these parameters in the standards under PFA with those prescribed internationally by Codex Alimentarius Commission.

It also removes the specifications for partly skimmed milk powder currently available under the PFA. This had been done because this product has become anachronistic with the development of adequate refrigerated storage and transportation facilities as well as processing capacities in the country.

The existing standards in PFA rules for atta, maida and soji require that they are free from uric acid, rodent hair, excreta among other things.

To further reinforce this aspect which has health implications, the PFA rules will now require that these products shall be prepared by milling, grinding from grains which are clean and free from rodent hair and excreta.

In products like barley powder, the grain would need to be not only clean and free from rodent hair but also properly dehusked. These provisions have been introduced as part of the ongoing exercise to ensure that consumers receive clean and wholesome food.

Indian Food Industry Vol. 20, No.3, May-June 2001

AFTER NEEM & BASMATI IT'S HESSIAN NOW

After neem, turmeric, and basmati, India has now successfully warded off

the European Union (EU) patent threat on the usage of hessian – jute cloth/ sheet as a material to cover wastes and dumping grounds, which India has been using since ages. A patent that had been obtained by a UK firm has now been revoked. India has always been making efforts to revoke patents illegally obtained by the individuals/companies for their commercial use.

This is one of the reasons why CSIR could get the patent revoked for turmeric, based on Indian use of wound healing qualities known over the years. Similarly, Research Foundation for Science Technology and Ecology (RFSTE) got neem patent vacated. It was revoked in May 2000. Finally, APEDA won a significant victory in September 2000 in the sphere of international patents when the Rice Tec Inc., withdrew four claims of its uniqueness for its basmati after it was challenged based on geographic appellation.

In 1999, Munich-based European Patent Office granted a patent to the British firm, Geohess (UK) Ltd., for the use of hessian, a jute material for covering the waste / dumping grounds. Indian Jute Mills Association (IJMA) took up the case immediately with the government of India for revoking the hessian patent granted to the UK firm. On behalf of the Indian government the case was fought by the Jute Manufacturers Development Council (JMDC) and the Indian Jute Industries Research Association (IJRA). The Kolkata based patent attorney firm, S. Majumdar & Co., represented India.

After sacking, jute hessian is the most popular jute product in the global market. Its close competitor is jute yarn. In 2000-2001, India exported about 65,000 tonnes of hessian worth Rs 250 crore. Geohess claimed that the company has been dealing with hessian from 1996 and sold over 4.5 million square meter of the cloth.

According to Article 27 of the Trade Related Aspects of Intellectual Property Rights (TRIPS) agreement of the World Trade Organisation (WTO), patents provide property rights to inventions of a novel idea, which permits in practice the solution of a specific problem in the field of technology.

Article 28 of TRIPS provides that patents give owners exclusive marketing rights, which allow them to prevent others from using the inventions covered. The patent on hessian would have adversely affected Indian export earnings.

The patent was challenged on the grounds of lack of novelty and inventive merits. It was argued that hessian was a well-known variety of jute product, which had been in use for many years in India. Thus, the patent that was owned by the British firm only aimed at monopolising the product. This amounted to appropriation without compensation of knowledge from the source country and if the patent is allowed then it would attract laws of bio-piracy, claimed India.

The order regarding the revoking of patent on hessian was passed on April 18, 2001 by the Opposition Bench of the Munich-based European Patent Office against the British firm, Geohess (UK) Ltd. While revoking the patent, the European Patent Office stated that hessian was actually a jute sheet or cloth. There was not much of a difference or innovation in the product for which Geohess had got the patent and it was used by Indians for a long time.

In order to avoid future patenting of Indian products by foreign individuals/ firms, India must document its traditional knowledge and suitably compensate tribal and rural people for getting that knowledge up-to-date. The Indian Patents Act (Second Amendment) Bill 1999 now with the 30-member Joint Parliamentary Committee should also be passed as early as possible so that Indians can get their food, agricultural, chemical and pharmaceutical products protected. It is good that India, through CSIR, is already working to put together a "traditional knowledge digital library" on traditional medicinal plants and systems and innovations based on traditional knowledge.

FISH EXPORTS FROM BENGAL TO TOUCH RS 600 CR

West Bengal's fish exports in the current year will touch Rs 600 crore and by the end of the Tenth Plan increase to Rs 1,000 crore, fisheries minister Kiranmoy Nanda said. He said that for the first time in the country an 'overall assistance centre' is being set up in the city at a cost of Rs 14.94 crore for exporting fish on a cooperative basis.

Ten processing plants, are being installed at the centre for quality control.

Another Rs 20-25 crore will be invested for installing machinery. Another fishing harbour will be set up at Kakdwip in the fifth phase.

The Centre has assured the state of providing infrastructure when the state government wanted to instal a wireless network to protect fishermen from pirates, in the Sunderbans region. The

Centre has invested a very small portion of its earning from fish export from West Bengal in the state.

NEW CARDAMOM SEED DEVELOPED

The traditional yield of cardamom in the country has been 150 to 200 kilogram per hectare. Efforts to develop new high-yielding varieties of seeds by various research institutes have not had much results. But the efforts of two farmers from Idukki in this direction, Sebastian Joseph and his son Reji Joseph have now been recognised by both the farming community and the authorities. The new seed variety that they have developed gives a yield of 800-1,000 kilograms per hectare. The two farmers have given their family name 'Njellaniyil' to the new seed variety that they developed using traditional techniques. Today, 'Njellaniyil Green Gold' is the seed variety with the highest productivity in the world. It is also used widely in the cardamom producing districts in the state. The father and son duo has also won national recognition for their efforts recently.

IDFC IN TALKS WITH STATES ON AEZ

Infrastructure Development Finance Corporation's (IDFC) food and agri division is actively pursuing the initiatives taken by the Agricultural and Processed Foods Export Development Authority (APEDA) in projects which are likely to be formulated and implemented to accelerate private sector participation in agriculture, O K Balraj, vice president and head agri division, IDFC stated.

While Uttaranchal has identified litchis and medicinal plants for AEZs, Gujarat is focussing on bananas, mangoes, castor and garlic and Maharashtra on mangoes, grapes and flowers.

Karnataka has identified vegetables and flowers while Kerala and Tripura are focussing on vegetables and pineapple.

INDIA TARGETS MIDDLE EAST

India is to tap potential markets such as Iran, Indonesia and Russia for meat exports in the wake of foot and mouth (FMD) and mad cow diseases in Europe, while traditional markets Egypt and Jordan have assured India of their continued imports from the country.

"India should benefit from the potential demand that would now arise for safe meat derived from naturally reared livestock, due to the mad cow and FMD epidemics that have plagued cattle in Europe," Rashid Kadimi, chief executive officer of meat export house Frigorifoco Allana said.

Kadimi said a major export breakthrough has occurred in Iran where shipments in recent months have increased ten fold to 2000 tonne per month from 200 tonnes per month earlier. Kadimi, whose company has nearly 65 percent share in India's export of meat products, said negotiations were also on with Russians who had submitted a draft protocol which was now under consideration of the Indian government and something concrete should emerge soon, he added.

Egypt, the single-largest buyer of Indian meat, has recently lifted a three month suspension on Indian meat imports. The country had banned Indian meat because of a reported outbreak of foot-and-mouth disease (FMD) in India.

The Egyptian agriculture ministry has signed the order to lift the suspension on Indian meat. Egypt has, however, extended the ban on European meat, especially bulk imports from Ireland. This is good news for Indian exporters since Egypt is likely to source a major chunk of its requirements from India.

According to market sources, Egypt imports 120,000-150,000 tonnes of meat annually. During the January-February period, India had exported over 10,000 tonnes to Egypt monthly.

Egypt will now continue to source meat from six approved exporters in India – three in Maharashtra, two in Uttar Pradesh and one in Andhra Pradesh.

According to Mr. Irfan Allana, chairman of Frigorifico Allana and president of all India Meat and Livestock Exporters Association, a large majority of Indian exports (around 97 percent) are de-boned, de-glanted bone-less buffalo meat. "The meat in India, which has a low pH value of below six and is frozen under minus 40 deg Cell, is the most riskfree stuff since no FMD virus can survive in these conditions," says Mr Allana. Jordan, had also lifted the ban on May 1.

WHEAT EXPORTS DECANALISED

The government has decanalised wheat exports and given permission for 50 lakh tonnes to be shipped out in '01-02.

The decision to allow a new export quota of 50 lakh tonnes comes after a delay of three months as last year's quota of 50 lakh tonnes was extended till June 30.

But an indication of the lacklustre response is the 28 lakh tonnes still lying unused from last year's additional quota of 30 lakh tonnes, announced by the food ministry on June 7.

In fact, despite being under pressure from food minister Shanta Kumar's ambitious target of 50-lakh-tonnes exports for '00-01, even state canalising companies like STC, PEC, MMTC, were unable to export more than 22 lakh tonnes in all.

In the new quota, FCI will be selling wheat to exporters at Rs. 4300 per tonne, which is marginally higher than the BPL price of Rs. 4150 per tonne in ration shops.

Agriculture and Processed Food Products Export Development Authority (Apeda) has now invited bids from exporters, which will be opened on July 20 and allocations from the quota made subsequently. With little likelihood of a substantial demand for Indian wheat, getting an allocation ought not be difficult for exporter, officials said.

Ironically, decanalising may have come too late in the day for Indian wheat exports because world markets are now willing to pay not more $95 per tonne, give or take a few dollar. Earlier, exporters were getting as much as $103-107 per tonne. At present, even wheat bought at the BPL rate of Rs. 4150 per tonne would find no buyers. Contracts now heading's way are, thus, small quantities and only from niche markets.

Private exporters are now caught between trying to meet Iraqi quality specification or renege on the deal and shell out huge default and penalty payments to the grain board. They have an extension till September to send fresh consignments.

Prospects of STC exporting 5 lakh tonnes to Russia have also speedily dried up following India's Iraqi debacle.

LABELLING NOTIFICATION

The final notification on Labelling of vegetarian and non-vegetarian food items G.S.R. 245 (E) will come into effect on October 4, 2001.

The Notification says that the manufacturer will have to declare animal content of any product, whether in fresh water or marine animal or eggs or products of any animal origin as an ingredient. This circle in brown colour," in a square with brown outlines", depending on the display are to the pack. Milk and milk products are exempt from this rule.

SWEET NEWS FOR THE NEW MILLENNIUM

India is all set to increase export of jaggery in the near future as studies have proved the benefits of consuming jaggery. According to Mr. Jaswant Singh of the Indian Institute of Sugarcane

Research, jaggery has enormous medical importance. Jaggery exhibits cooling, diuretic and refreshing properties, besides improving throat conditions, normalizing semen and sperms, and serving as a lactogenic and cardiac tonic. It has also been prescribed for various diseases like anaemia, jaundice, breathlessness and kidney problems. Every 100g of jaggery contains approximately 0.4g protein, 0.1g fat, 80g calcium, 40mg phosphorus, 11.4mg iron, 0.6-1.0g total minerals, 168mg carotene, 0.02mg thiamine, 0.05mg riboflavin, 0.50 mg vitamin C and 383 kcal energy.

(PTI) Science Service, 16-31 January 2001)

EXPORT OPPORTUNITIES FOR ORGANIC SPICES

Given the increasing demand for organic spices in the global market, there is a tremendous potential for its exports, if concerted efforts are taken to promote their organic cultivation. The global demand is expected to be 57,000 tonnes, which is about 10 per cent of the conventional spices market estimated at 5.7 lakh tonnes.

Spices exporters attribute this growth to the move towards convenient foods which has an impact on the demand for organic spices. Besides, there is a growing shift in the developed world towards organic food products. According to them, processed foods can be labelled only if 95 per cent of the ingredients originate from organic agriculture. Organics, they opine, may garner about 10 per cent market share in the Europe, the US and Japan within the next decade.

Europe, with a turnover of $5.6 billion, is an important organic market and Germany tops in turnover which stands at 40 per cent of the European market. "The European don't want to eat contaminated food products and therefore, they go for natural products. Around 50 per cent of the organic products consumed in Germany is produced domestically while the rest is imported. Though organic products are costlier, consumers are concerned only about the naturality of the product. The prices will come down once mass scale production commenced.

Even in the US, the turnover of organic products which was $1.5 billion in 1992, touched $2.8 billion in 1995 from where it reached $4.2 billion in 1997. It is estimated to touch $ 6.4 billion in 2000. The country's export of organic spices has been negligible and confined to around 100 tonnes of black pepper and small quantities of white pepper, small cardamom, ginger, turmeric, mace, nutmeg and vanilla. However, in a bid to promote such products, the Indian Spices Board has started laying emphasis on pepper and small cardamom. It has also prepared a document which deals with concepts, principles, basic standards, production guidelines, documentation, inspection and certification with regard to organic spices. Besides, the Board has initiated research programmes on organic cultivation of important spices

WHAT IS SAFFRON?

Saffron, the most expensive spice in the world, is obtained from the stigmas of the flower of Crocus sativus, commonly known as Rose of Saffron.

Farmers handpick the rose of saffron and afterwards separate the red stigmas from the rest of the flower. The fact that more than 85,000 flowers are needed to obtain just one kilo of saffron gives us an idea of how hard this work is and why this product is so expensive.

Saffron has three properties that make it very valuable in cooking. These are the following:

- Coloring power: Saffron gives a yellowish color to meals which enhances them making them look more appetizing.
- Flavor: The flavor of saffron is unique when used in the correct quantity, it given the dish a slightly bitter and earthy taste that makes it delicious.
- Aroma: The aroma of saffron is very appealing and is also used for perfumes.

Saffron has many medicinal properties as well. Boiled with milk, tea or coffee, it is good for the throat, for circulation and gives strength for sexual life.

Since saffron is a very expensive spice, many people will try to obtain extra profits by adulterating it. Therefore, it should be bought from a trusted brand name.

Moreover, a saffron that is completely red with many small broken filaments should not be trusted. It is probably adulterated.

Long trumpet shaped filament that have a yellow termination should be sought after since is the natural presentation of saffron.

Finally, do not trust some cheap brands of saffron packets in red cellophane. This fancy packaging does not allow checking the quality of the product and when opened, one might find that it is adulterated.

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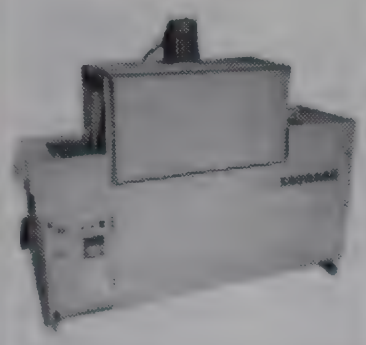

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INTERNATIONAL NEWS

NEW HALAL LOGO

A new halal logo will hit the global consumer market soon. The bright green and blue logo, with the inscription "Halal" in the centre is the mark of Halaalan Thoyyiba (HT) Global Standard[CM], the latest addition to international certifications available today. Launched at the recently concluded SIAL ASIA – The International Food & Beverage Exhibition for Asia in Singapore, the new standard is the first of its kind to integrate both the halal and quality/safety requirements into a single certification.

Realising the importance and sensitivity of Muslim consumers worldwide, product manufacturers over the years have been using 'halal' logos as the mark of halal guarantee to cater to the need of the Muslim market. The consent to use the halal logos is obtained after the product is certified as such by Halal Certification issuers. Presently, halal certifications are undertaken by the local religious authorities in the respective countries/localities and are meant for the local market requirements. As a result, there are the inevitable differences in guidelines and procedures from one halal certification to another. Consumers on the other hand, are often confused by the various halal logos adorning products lined in rows off the supermarket racks.

HT Global Standard[cm] was introduced with the intention to standardise the various halal certification in the market today into a single halal certification based on a single standard. Besides complying with the expected halal requirement, the new certification has been given an added feature to include quality/safety components, which is the first of its kind.

Products certified as compliant to HT Global Standard[cm] is assured of halal and quality/safety. Each product undergoes a stringent set of procedures laid by the standard to ensure its halalness and quality/safety in every stage of production before the certificate is awarded. **Societe Generale de Surveillance (SGS)**, a world leader in quality certification services, is contracted worldwide to deliver the quality system, while local Islamic Certification Authorities will carry out the HT verification of the 'Halal' component based upon the requirements of the standard.

HT Global Standard[cm] is based upon the concept of "*Halaalan Thoyyiba*", and is the brain child of Eternal Crescent (UK) Ltd. (EC), a non-profit organisation which subsequently sponsored the drafting of the Standard and is currently the registered owner of the standard.

The regulator ofHT Global Standard[cm] is the Supreme Islamic Consultative Council for Halaalan Thoyyiba (SICC), which is based in Jeddah. Prominent members of SICC are Sheikh Fauzi Fadhi, Al-Zafzaf (Al-Azhar University, Cairo), Dr. Mahmood M. Mohd. Amarah (Al-Azhar University, Cairo), Dr. Ahmad Ibrahim Shukri (Saudi Arabia), Dr. Saad b. Hamdy Al-Masaudi (King Abdul Aziz University, Saudi Arabia), and Dr. Muhd. Fauzi Mohamad (Putra University of Malaysia, Malaysia). An independent Fatwa Council supports SICC for matters relating to religious rulings.

Ilham Daya Consolidate Sdn. Bhd. (IDC), a Kuala Lumpur based company has been appointed by EC to coordinate the overall certification schemes under the HT Global Standard[CM], IDC is also responsible for publishing and marketing of the Standard worldwide.

NEW ZEALAND DAIRY FARMERS TO MERGE

New Zealand dairy farmers will merge together and form a company called Global Dairy Company or GlobeCo. This company brings together farmer-owned processors, NZ Dairy Group and Kiwi Cooperative Dairies with their jointly owned export marketing wing the NZ Dairy Board.

The company will control about 7% of New Zealand's gross domestic product (GDP) and 20% of the country's annual NZ$30 billion in exports.

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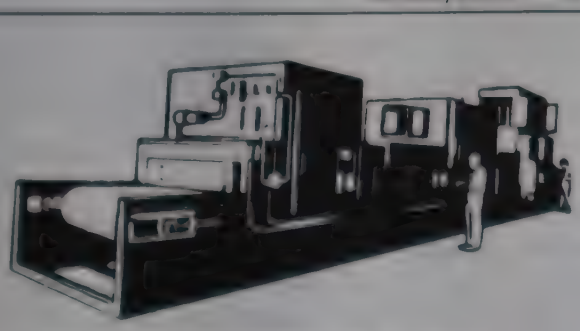
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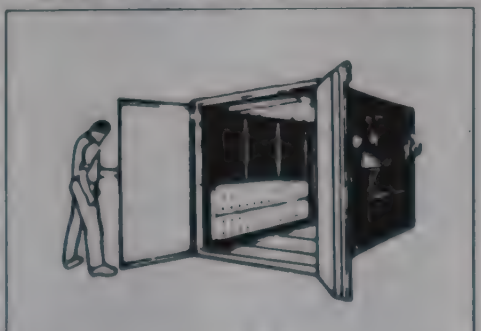
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The merger has been driven by a desire for scale in a food ingredients sector dominated by multinational companies such as Kraft Foods, a unit of Philip Morris Company, Nestle AG and Italy's Parmalat.

It will be the world's ninth largest dairy company with annual revenues of more than NZ$10 billion from assets of around NZ$7.5 billion. The government said it would move quickly on the next stage of the merger plan. The proposal was backed by 85 percent of NZ Dairy Group farmer shareholders and 82.89 percent of Kiwi's farmer shareholders, both well clear of the required 75 percent margin.

GLOBAL MEAT INDUSTRY IN TURMOIL OVER FMD

Barriers are going up all over Europe on the movement of animals and meat products as France confirmed fresh evidence of the foot-and-mouth disease. And even as Europe went on a heightened alert, the US Agriculture Department suspended all imports of animals and animal products from the European Union countries.

The EU veterinarians voted to ban exports of all cloven-hoofed livestock-mainly cattle, pigs, sheep, goats and horses – from France for two weeks. The other European countries have taken their own initiatives – Germany has been tracing imports of livestock from Britain and France since mid-January. Holland has banned movement of most types of large livestock. Portugal has banned import of all French meat. Now, even Norway closed its borders to imports of all farm products from the E U countries. Some countries have so far arbitrarily banned imports of livestock and meat products and as the Agricultural Minister of Belgium put it "this frightens us". Unlike the mad cow, the foot and mouth is harmless to humans and may not even be fatal to animals, but its impact is more economical. The infected animals lose weight and their milk yields drop and hence render them as an economic liability for farmers.

Concern over FMD was not limited to Europe alone after Argentine officials confirmed one case of the disease. The US, Canada, Australia and Japan all moved to ban some agricultural imports from Europe.

For now, the key method of containing the disease is mass slaughter of animals with suspected infections, a move that is likely to result in higher prices for meat.

The ban would have the biggest impact on imports of pork from the Netherlands and Denmark. Imports of beef from the European Union were already banned because of the mad cow disease. Japan announced that it had suspended imports of pork and other livestock from France. Japan also banned livestock imports from other countries hit by foot-and-mouth disease, including Britian, Argentina, South Korea and China. Australia banned imports of all meat, livestock and dairy products from the European Union.

The EU estimated that the US import restrictions would affect $500 million worth of annual sales in meat and livestock. The US estimated the impact at less than $400 million. Beef prices in Europe have fallen by about 27 percent.

Britian stopped dairy, meat and livestock exports shortly after the first case of the disease was confirmed. More than 150,000 livestock there have been destroyed or earmarked for slaughter.

WATER A BIGGER PLAYER IN BEVERAGE ARENA

Carbonated soft drinks, with about 80 percent of sales, still control the nonalcoholic drink market. But water is becoming a bigger player in the beverage arena as people search for healthier options, and its high margins and increasing consumption are attractive to a slew of beverage companies.

Noncarbonated bottled water is the fastest-growing beverage category in the United States, and behind private label waters, Pepsi's Aquafina is the top selling brand at US retailers. For the 52 weeks ended May 20, water sales topped $2bn, up 18.5 percent from that period a year earlier, according to data from Information Resources. Aquafina accounted for almost $185m of those sales.

Sales will likely keep climbing. According to industry group Beverage Marketing, average intake of bottled water grew by 1.2 gallons to 18.2 gallons per person last year. Per capita consumption has jumped at least a gallon per year since '95.

However many bottled waters don't offer anything too different from what you can get from your kitchen sink. "I don't necessarily see any difference in it," Kathie Nelson, registered dietitian and supervisor at the Methodist Health Care System's Institute for Preventive Medicine, said about bottled waters though consumers will still scoop up the bottled drinks because of brand identity and convenience.

Aquafina was launched in Kansas in '94 and went into national distribution three years later, while Coca-Cola introduced its Dasani brand in '99. Dasani is currently the No. 3 brand at US retailers behind Aquafina and Perrier's Poland Spring, but its sales are growing at a rapid clip.

Pepsi's Aquafina is the official bottled water Major League Soccer and the NCAA Championships, among others. The water's new ad campaign promotes the basic premise, "Aquafina: So pure we promise nothing". Meanwhile, Coca-Cola promotes Dasani with the tagline "Life Simplified". The Dasani website (dasani.com) even offers a self-test to measure your "personal balance index".

While Coke and Pepsi have flung themselves into the bottled water craze, Cadbury Schweppes, the No. 3 soft drink player in the United States with brands like Dr. Pepper, has kept its focus on carbonated drinks.

Beverage industry consultant Manny Goldman said water's fast growth is going to slow down. He argues that it's never going to be a large part of the overall nonalcoholic drinks business. Others see growth continuing at a fast pace.

For those looking for an in-office or at-home alternative to bottled water, Advanced Medical Technologies plans to launch WaterStar, which draws water vapor from the air and filters it, this fall or early next year.

Advanced Medical claims WaterStar will produce water for just 8 cents per gallon, but the start up costs are high. A 5 gallon system will initially sell for about $1,450, a price the company admits is likely to dissuade some users. A number of companies are attracting consumers to their waters by adding nutrients to their water. Reebok International and Clearly Canadian Beverage sell Reebok Fitness Water, aimed at exercisers who want an energy-boosting drink but would rather skip the high calories in sports drinks such as Quaker Oats Gatorade.

Even Gatorade is in the game. Its Propel Fitness Water, available in some US states, has one-fifth the calories of regular Gatorade, which packs 50 calories per 8 ounce serving.

Smaller beverage companies, such as Energy Brands Inc., also target consumers who want more, not less, in their water. Energy Brands, which was started by Darius Bikoff five years ago after a water contamination scare in his New York apartment building, sells Glaceau brand bottled water with added nutrients, such as calcium and potassium. The company also has other lines of water with more enhancements, such as Vitaminwater, Soywater and Fruitwater.

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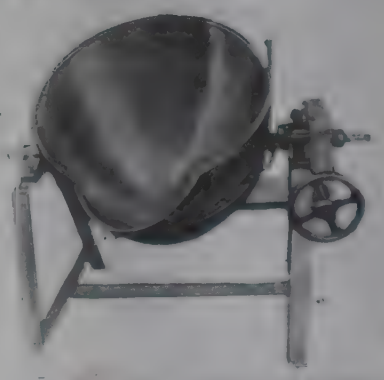

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COMPANY NEWS

GROVER VINEYARDS LTD.

For the first time an Indian wine manufacturing company will sell wine to France the traditional home of wines. Grover Vineyards Ltd., located near the southern city of Bangalore, is to sell 50,000 bottles to France, and is now eyeing other European markets.

Grover has a 50 percent share of the market in premium wines priced at around 300 rupees (six dollars) per bottle. The company's revenue in the last fiscal year was 40 million rupees (850,000 dollars) and this was projected to grow by 50 percent next year.

India's unorganised wine market is estimated to number two million units per year, including imported bottles and the grey market, and is growing at an annual rate of 20 percent.

Grover will export Cabernet Savignon and La Reserve red wines and Blancs de Clairette and Rose-Dry white wines to France. Their next targets are Germany, Switzerland and Italy, Grover wines are already sold in Britain

The company's plant, situated 40 kilometres (25 miles) north of Bangalore in Dodballapur, produced 300,000 bottles of wine in the year to March 31, up from 250,000 the previous year.

France's Veuve Cliquot Ponsardin owns a 20 percent stake in the company and provides technical support. The rest of the equity is held by financial institutions, collaborators and the Hindustan Export and Import Corp.

SEAGRAM

Seagram Manufacturing units are all set to be taken over by Groupe Pernod Ricard and Diageo Plc. Seagram was bought over by Pernod-Diageo combine some months back. According to an arrangement in India on distribution of responsibilities, Seagram's operations in India would come under Pernod's fold and the latter would manage and control Seagram's entire liquor business here.

This would convert Pernod into a large liquor manufacturing and distribution house. Diageo's outfit in India, UDV, would have nothing to do with Seagram's operations in the country.

Pernod was given Seagram India's control by the parent companies to complete Pernod's portfolio of brands in India. According to the deal, Pernod gets scotch brands of Seagram like Chivas Regal, Glen Grant, Royal Salute and Glenlivet whiskies as well as Martell cognac and Seagram's Gin, and several national brands in Latin America, Asia and Europe.

Pernod Ricard, currently, has only one brand – Tilsbury in the market. By taking over Seagram's operations in the

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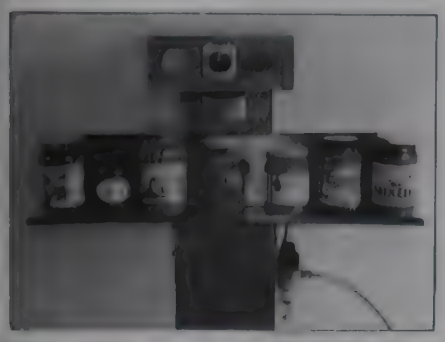

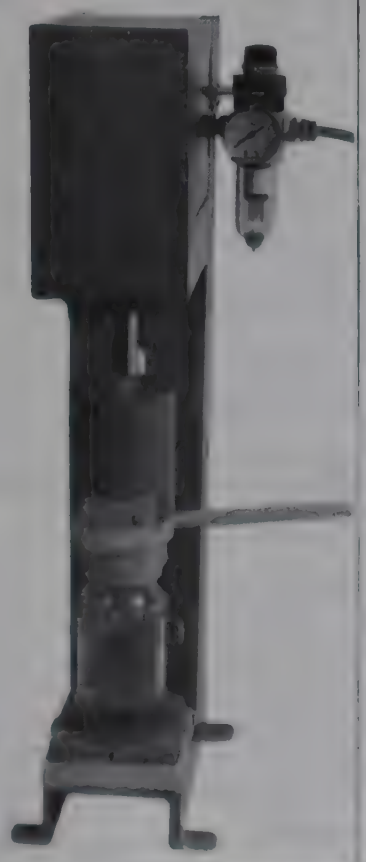

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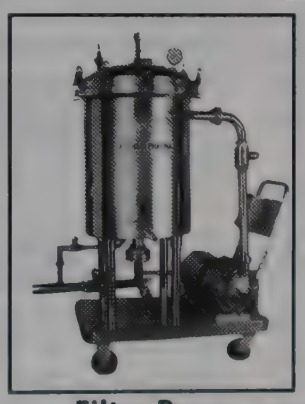
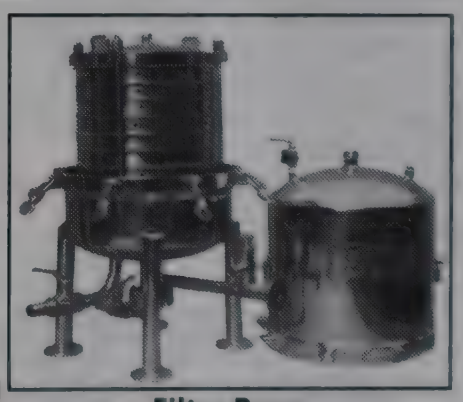


Filter Press standard model with back wash



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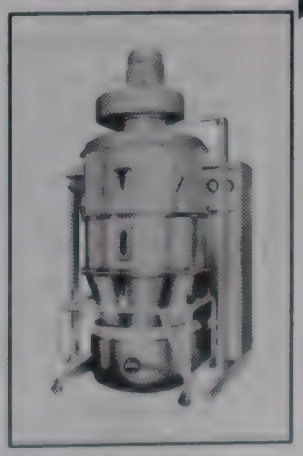
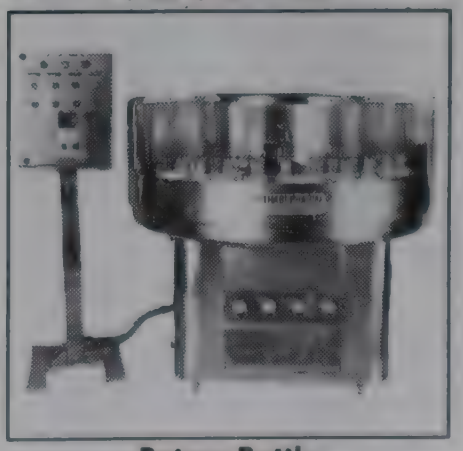


Fluid Bed Dryer



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country, Pernod will become a strong player in whisky and scotch segments and will utilise the vast distribution network of Seagram.

MYSORE BREWERIES/SOUTH AFRICAN BREWERIES

South African Breweries have succeeded in picking up 75.77 percent stake for about $20 million in Mysore Breweries the manufactúrers of "Knockout Beer". The South African Breweries are the biggest players in the world. South African Breweries would continue to market the Knockout brand. South African Breweries, famous premium beer brand is Castle. Consequent to the acquisition, South African Breweries would also gain an indirect control over Pal's Distilleries, a subsidiary of Mysore Breweries. Under Pals Distilleries, it has a brewery division in Aurangabad and a distillery division at Bangalore. Its other subsidiary is MBL Property Developers and Pals Industries.

Multinational companies were keen to use the large network of outlets available with MBL. The brewery group has around 10,000 retail outlets in the country, sources added. The other major brands of Mysore Breweries are Bengal Premium, Pals Premium and Seven Stars.

It also has a mineral water brand marketed under the name, *Stream*. Mysore Breweries caters to the Andhra Pradesh, Karnataka, Tamil Nadu and Maharashtra markets.

SHAW WALLACE

Shaw Wallace Group proposes to merge two of its brewery companies. As a part of this proposal, the Hyderabad based Charminar Breweries will merge with Skol Breweries Ltd. Both are subsidiaries of Shaw Wallace. Charminar Breweries was acquired by Shaw Wallace in 1995. At present, the group holds about 54.8 percent stake in Charminar Breweries, which has a brewery unit near Hyderabad with a capacity of 25.64 lakh cases per annum. For the year ended March 2001, Charminar Breweries has recorded a net profit of Rs 2.17 crore on a turnover of Rs 46 crore.

COCA COLA INDIA

The soft drinks giant Coca Cola plans to introduce a watermelon flavour of its popular carbonated soft drink brand Fanta in Bangalore and Chennai. Fanta flavours available globally in the Coca-Cola system were scanned and samples from Australia, China, Thailand were procured and about eight flavours were identified from these countries suitable for Indian customers' need. "After thorough and rigorous research of consumer taste, smell, visual appeal, mouth feel (through ORG-MARG) the green apple and watermelon flavours came out as overwhelming favourites on all parameters," revealed Mr Jain, region operations director, Coca Cola. The company recently launched Fanta Green Apple in Chennai market," he added. In Karnataka, the company would be launching both the flavours shortly.

Coca-Cola's Indian subsidiary has recently taken over the distribution networks of two local companies' bottled water brands in a bid to increase the market share of its own Kinley label.

A spokesman for the Indian unit identified the two distributors as Thermax Culligan Water Technologies and Nuchem Weir. Thermax supplies water in Mumbai and Pune, where the firm is based. Nuchem's brand is sold around Delhi, where that company is based. Thermax and Nuchem will now use their plants to bottle 20-litre packs of Kinley, which Coke will supply to their existing customers, the Coke source said. He would not divulge further details of the arrangement. Coke reckons it has around a 12 percent share of the bottled water market, now estimated to be worth Rs 600-1000 crore ($128-213 million).

HINDUSTAN LEVER LTD / MOTHER DAIRY

Once again Hindustan Lever Ltd. proved to be the market leader in the ice cream segment when it overtook Mother Dairy in Delhi recently. HLL's retail market share in value terms stood at 48 percent in April against Mother Dairy's 44.7 percent. This is perhaps the first time that Mother Dairy has lost its dominant position in ice cream segment in Delhi. According to ORG-Marg, with a 48.6 percent market share in March, Mother Dairy was ahead of HLL by over 5 percent. But finally, in April this year, HLL managed to overtake the company.

Mother Dairy has certain advantages in Delhi as it can use its milk booths to sell ice creams. Amul is not believed to be selling in Delhi because of a territorial arrangement between Amul and Mother Dairy.

In Mumbai also, HLL's market share has improved in April, while that of Amul has suffered a marginal setback. While HLL's retail market share in value terms has gone up from 37.1 percent in March to 40.8 percent in April, that of Amul has come down from 32.8 percent to 31.3 percent during the period.

BARISTA COFFEE COMPANY

Barista Coffee Company, the coff retail chain promoted by the Turn Morrisson Group, is looking for a strat gic partner.

The main aim in inducting a partner to bring in more expertise and valu addition to the brand. The strateg partner could either be a foreign coff retail chain like StarBucks or a dome tic coffee maker. Rabo India Finan has been closely working with Barista find a partner, sources said.

The company is also looking at i vesting around Rs 25-40 crore durin the current financial year to augment i retail outlets. So far, Barista has i vested Rs 15-18 crore over the la year. As part of the expansion plan Barista will also increase the number its espresso bars from 34 to 76.

DS FOODS LTD.

The DS Group, a Rs.600 crore com pany which made a foray into brande salt and pepper (Catch salt and Catc pepper) and spices is all set to launc DS Foods Ltd., a company solely ded cated to the Food and Beverage Secto The company has launched '*Catch Natu ral Spring Water*', India's first bottle spring water from the Himalayas as pa of the beverage category, and all-natu ral freshener 'Pass Pass'. Other prod ucts that the company plans to intro duce in the beverage category includ Iced Tea, Club Soda, Flavoured wate etc.

The company plans to introduce sev eral new and high quality products in th market in coming years such as tea edible oils etc.

The new company, DS Foods ha production facilities for its current rang of products at Noida in UP and at Kul in HP. The company has its offices i Delhi and Noida and has set up a wide spread distribution network supporte by dealers and retailers across the coun try.

DS Foods has stringent quality con trol measures backed by well equippe and sophisticated laboratories to tes the quality standards of their products

CARGIL FOODS

Cargill is an international marketer processor and distributor of the agricu tural, food, financial and industrial prod ucts. They are producers and marketer of salt, processors of oranges for juice meat and poultry. They plan to bring t India under brand name *Naturefresh* atta, maida, sooji, cooking oils (Sun flower, palmolein, soyabean oil), rice pulses and salt. They have end-to-en

presence in the value chain having highest standards and passion for quality, with processes that ensure no human touch.

DABUR INDIA

Fast moving consumer goods company, Dabur India may soon launch a new brand in the health and nutrition drinks segment. Though the name of the brand is still to be decided, the drink is likely to be a coco based powder, ready-to-dilute in milk.

Currently, the leading players in this category are Smithkline Beecham with brands such as Horlicks and Boost and an estimated 70 percent market share, Cadbury's Bournvita, Complan from Heinz, and Milo from Nestle.

Dabur Foods Ltd., which will break even in fiscal 2000-01, is working out an aggressive expansion plan for its fruit juice portfolio. About four fruit-based beverages are expected to be introduced within the current year.

The company is also foraying into papads and pickles, a bastion dominated by the unorganised sector.

Both papads and pickles are already being test-marketed. Four variants of papads are being test-marketed in Chennai - Punjabi Masala, Urad and two appalam flavours.

Meanwhile, the company announced a packaging innovation for 1-litre packs of its fruit juice brand, *Real* which will henceforth be made available with a spin cap, developed in partnership with Tetrapak, apart from a six layered composite carton with double seal capping. 'Real' is currently available in five flavours – orange, mango, pineapple, mixed fruit and tomato. Dabur Foods also announced a price restructuring for all *Real* variants, due to upgraded packaging.

Dabur Foods is also planning to step up its presence in the export market with *Real*. Besides, the company intends to enhance the media presence and sampling and school-based programmes for the *Real* brand. The company has a manufacturing base in Nepal for the *Real* brand.

AMUL / TATAS

For the first time in corporate history, a leading consumer goods manufacturer and a leading cooperative are planning to jointly launch an instant-coffee brand targeted at the premium end of the market. The players involved are the Rs 216 crore Tata Coffee and the over Rs 2,258 crore Gujarat Co-operative Milk Marketing Federation (GCMMF). It is reliably learnt that Tata Coffee and the GCMMF have been holding intensive discussions over the last several months. The rationale for the synergy is that GCMMF has developed a comprehensive national distribution network while Tata Coffee has the expertise in processing and marketing coffee. The gameplan: GCMMF will source instant-coffee from Tata Coffee and distribute it through a network which is perceived as a key factor for the success of its Amul brands.

NESTLE INDIA

Maggi has replaced Nescafe as the focus brand of food & beverages company Nestle India this year. Nescafe had been the company's core brand since '98 end, when Carlo Donati took over as the managing director.

The company's entire coffee range, which is part of the beverages segment, is marketed under the Nescafe brand. The coffee portfolio has about five products – like Nescafe Select and Sunrise. The culinary segment, on the other hand, is under the Maggi portfolio and comprises products like Maggi 2 - minute noodles, Maggi ketchup, Maggi cubes, Maggi pickles and Maggi soup. While Maggi soup has five flavours – rich tomato, rich chicken, rich mushroom, mix vegetable and chicken sweet corn,

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Nestle is already in the process of strengthening its flavours within the instant noodles and ketchup segments. It has launched a new tomato flavour in the 2-minute noodles segment and a tamarind variant in the ketchup segment. On the flip side, it has discontinued all the flavours in the 2 minute noodles segment except for the popular "masala" flavour.

The company has once again emerged as the leader in the instant noodles category after it lost its preeminence with a failed attempt to change the flavour of its top-selling masala flavour. With a thumbs-down from consumers, Nestle had to pull out the new masala variant and relaunch the original one.

Describing the strategy, he said Nestle would initially start with the existing core flavours and then innovate. "Noodles is a very versatile segment and we are positive it will do well in it with more focused attention," Mr Donati said. The new focus for the Maggi brand will provide the much-needed impetus for the culinary segment, which has lagged behind some of the others.

Nestle India is also on the lookout for acquisitions of bottling plants for its Pure Life bottled water. The move is part of its expansion plans. The company is currently in the advanced stage of talks with the Mumbai-based Atco Healthcare, manufacturers of Brilliant mineral water, for a possible tie-up.

Nestle India launched its Pure Life brand of bottled water in February this year. Compared with other players in the segment, the company has kept a low profile.

Apparently, three more plants of Atco Healthcare are under implementation at Jaipur, Chandigarh and Delhi and are likely to be operational by the year-end, while Nestle currently has only one manufacturing facility for its water business in the northern region.

However, it is learnt that the proposed contract faces two issues: the first being the cost of the deal and the second is that Nestle does not want Atco to manufacture any rival brand apart from its own brand, Brilliant.

TROPICANA BEVERAGES CO.

Tropicana Beverages Company, a part of the PepsiCo group, has introduced new flavours like tomato and mixed fruits, clearly aimed at helping the company maintain its leadership in the juice market

Incidently, the new flavour sweet orange, is being targeted at those customers who are not used to the regular orange flavoured juice, which Tropicana sells world-wide.

Tropicana is also exploring the possibilities of local production of juices from Indian fruits like mango. The juice market in India is valued at Rs 100 crore, with Tropicana having close to 30 percent share, a volume which the company hopes to raise to around 40 percent within the next 12 to 18 months. The company was positioning the product as a 'health drink'. Tropicana is available on a selective basis in over 14,000 outlets spread over 16 cities of the country.

PARLE BISLERI

Parle Bisleri plans to invest Rs 260 crore to expand the distribution network and bottling capacity. Bisleri currently holds a 70 percent market share in India's Rs 700 crore branded mineral water market. The company plans to invest Rs 60 crore for expanding the existing facilities whereby the bottling capacity will be doubled to 200 million cases a day and an additional Rs 200 crore for expanding the distribution network by five times. It has also introduced home delivery facility for its 20 litre pack (Rs 70 MRP) which will be delivered by a specially designed fleet.

NICHROME

The Pune-based packaging machinery manufacturer, Nichrome Ltd., is all set to launch a new line of machinery for making aseptic pouch packaging. Simultaneously, it is gearing up for a September launch of 'standi pouch' aseptic pouches which will allow milk producers to completely eliminate the cold-chain for transporting the milk and expand their area of operation by considerably increasing shelf-life of the product. The product can be customised to allow milk manufacturers the flexibility to offer long-life milk to customers at various price points.

The company has already invested over Rs 1 crore in developing the aseptic pouch machine prototype and expects to spend the same amount, before the design is finished for launch by September.

Earlier, Nichrome and Tetra Pak India, a 100 percent subsidiary of Tetra Pak Sweden were partners in a venture called Tetra Pak Nichrome India, but the Swedish firm decided to quit from the venture amid heavy losses and poor sales. "Tetra Pak's marketing global arm did not like the idea of selling pouch filling machines as it was cheaper with less profit margin and started competing with their own machines. The technology was ours and they were to market form-fill-seal pouch machines", said S V Joshi who pioneered India's first plastic food grade milk packaging for Kurla Dairy at Mumbai in March 1978.

Tetra Pak India had picked 50 percent equity in Nichrome in September 1995 at a cost of Rs 7.5 crore and had committed to market 100 machines per annum valued at $45,000 each. "Tetra Pak India lifted only 340 machines in the first 3 years of entering into the tie-up as against the commitment to market 100 machines per annum.

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HEINEKEN BROUWERIGEN

Heineken beer, the largest selling beer brand in the world after Budweiser, has made a formal entry into India, with about 50 outlets in Mumbai selling the brand since last week. The beer brand from the Amsterdam based brewing company Heineken Brouwerigen, boasts annual sales figure of 1,300m cases. It had made its first foray in India in the 1890s, when it was consumed by Britishers living in India.

Heineken now has the distinction of being the first international brand to be launched here in the open market, after entry barriers were brought down. It is available in bottles and cans of 330ml at a price of Rs. 130. The beer is distributed in India through Sansula International Brands.

MOET-HENNESSY

The Moet Hennessy Group has formally announced the launch of its international brands in the open market of Mumbai. The famed Dom Perignon champagne, promoted by Moet Hennessy as a "constant miracle" will now be available in Mumbai for Rs. 10,000 a bottle and Hennessy XO, the top of the line cognac, is being priced at Rs. 11,000 a bottle. The Moet & Chandon brand of champagne will be available at Rs. 3,200 a bottle. In cognacs, Henessy VSOP is being priced at Rs. 4,000 a bottle and Hennessy VS at Rs. 2,200.

Hennessy XO is being promoted as a pre-dinner drink on the rocks while Hennessy VS is being positioned as a drink for the youth, mixed with ginger ale, tonic and soda. Aswin Deo, managing director of Moet Hennessy India, said: "We are the first international wine & spirit company, post-removal of QRs, to officially commence marketing and distribution of 'Bottled in Orgin' products in India".

Having launched the products in

Mumbai, the group will move to New Delhi for its second launch. It also plans to market its products in Pune, Goa, Bangalore, Hyderabad, Chennai and Kolkatta. Moet Hennessy India is a part of the world's leading luxury goods group LVMH (Moet Hennessy Louis Vuitton).

ASTRA

The Centre for Application of Science and Technology for Rural Areas (Astra), part of the Indian Institute of Science (IISc), Bangalore has developed a unique vegetable and fruit preservative drier which can preserve the produce in a dry form for over six months without preservatives. The drier removes the moisture from the vegetable or fruit and leaves it in a dry form, which can be preserved in air-tight cellophane bags for long periods.

The drier is a cabinet chamber with brick walls and provision for trays in layers to keep vegetables or fruits in their original form. The structure's (the size can vary according to the intended volume of the produce sought to be dried) top, bottom and side provide the three heating surfaces which are attached with metal coils that are heated using biogas.

Vegetables and fruits generally have 50 to 70 per cent moisture which is gradually reduced at temperatures ranging from 60 to 70 degrees celsius, depending on the vegetable or fruit and the moisture content it has. The time taken to complete the drying process differs from each vegetables or fruit as the moisture content varies among them. The temperature can be regulated with a dial attached to the temperature meter. The dried produce can be preserved in powdered form in air tight bags up to six months and still be consumed by just mixing water or milk before adding it to different dishes.

MCDONALDS

McDonalds, the fast-food chain that has become synonymous with urban living, is all set to break boundaries and go national through the arteries of the country — the national highways and expressways. Travellers will no longer have to be content with *dhabas* offering *dal-roti* and can now look forward to biting into burgers, French fries, McPuffs et al. McDonald's (India) is now planning to start drive-through restaurants on express highways across the country, the first of which will come up on the Mumbai-Pune highway soon, while plans are afoot to have three more on the NH.1 in the North.

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McDonald's is projecting an Income of 15 to 20 per cent from drive-through business on expressways in the immediate future. This is expected to grow up to 40 per cent over the next five years. The company has already tied up with public sector Bharat Petroleum to set up restaurants at petrol pumps across northern India.

McDonalds will have to face competition from the more affordable *dhabhas*, the roadside eateries, that dot highways across the country. The company's confidence stems from its experience in north India, where it has a 170-seater restaurant at Noida.

FRICK INDIA LTD.

Frick India Ltd., a leading refrigeration and air conditioning company, has launched its ultra low oxygen (ULO) cold stores, that can help reduce the wastage of crops and produce.

The ULO cold stores allow for storage of fruits and vegetables for longer periods than current cold stores are capable of. They also permit better preservation of the basic colour, a firmer product, long shelf life, decrease in ethylene production and ethylene sensibility and decrease of decay sensibility. The cold stores are priced between Rs. 50,000 and Rs, 3 crore depending on the capacity of the units.

TATA TEA/TETLEY

Tata Tea is set to merge the operations of Tetley with itself. The move would allow Tata Tea and Tetley to operate as a single company said Homi Khusrokhan, managing director, Tata Tea.

"We are working on merging the operations of Tata Tea with Tetley, both in the domestic market as well as overseas market" he said. The companies would benefits mutually through synergistic operations.

Tata Tea would also draw on Tetley's expertise in blending, tasting and packaging. Tetley primarily blends, packs and distributes tea products, mainly in tea bags. Tetley's product portfolio covers not only tea bags, but also instant teas, flavoured teas, green teas, decaffeinated teas and herbal teas.

The Tetley group has a strong market position in the US, Australia and Europe and is a market leader in the UK and Canada.

Tetley has five production centres- one in UK, two in the US, one in Australia and one in India and all these centres have latest technologies and facilities for tea packaging and Tetley's history of innovations include the original tea bag and the drawstring bag.

Analysts said after a recent briefing by the company, as part of synergistic operations, training would be given to Tata Tea personnel in buying and blending tea, which would make it suitable for exporting to Tetley. Tata Tea is also toying with the idea of launching Tetley brands in India.

Tata Tea has already integrated its marketing network with that of Tata Coffee, a subsidiary of Tata Tea. The two companies now have one national marketing organisation and Tata Coffee's branding sales and distribution is now vested with Tata Tea. Tata Coffee happens to be Asia's largest integrated coffee company.

The virtual integration of Tata Tea and Tetley would bring the company a step closer to operating as one beverage company. Tata Tea reported a decline of 19.59 per cent in net profit to Rs. 100.21 crore for 2000-01 compared with Rs. 124.63 crore last year.

MARKETFED

The Kerala State Co-operative Marketing Federation (Marketfed) has forayed into the value-added products market with its packaged coconut water, milk and desserts and spices.

"Marketfed has brought out products such as coconut water, milk and dessert in flavours such as chocolate, strawberry, vanilla and mango, coconut powder, oil and a whole range of spices and spice mixes. The federation plans to launch these products in all metros soon," Jose Kuttiyani, chairman of Marketfed said.

The products were launched in Delhi by Chief Minister Sheila Dikshit. The products will be marketed through all the Mother Dairy outlets across the city apart from the retail outlets of the National Agricultural Cooperative Marketing Federation of India (Nafed) and the Kendriya Bhandars.

"The entire range of products will be available at all the 1,000 Mother Dairy outlets in Delhi apart from milk outlets in Kolkata and Mumbai. In Bangalore and Chennai, we are tying up with a departmental store to sell these products," Kuttiyani said.

All the products are priced resonably and the cooperative hopes to earn a revenue of Rs. 50 lakh per month from its sales, Kuttiyani said.

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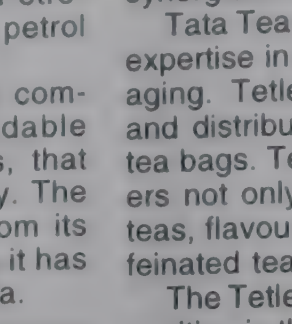
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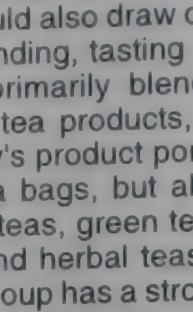
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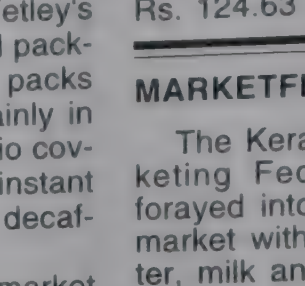
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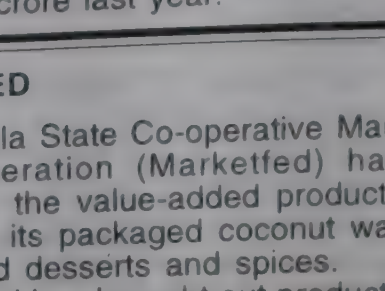
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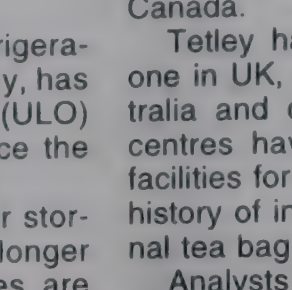
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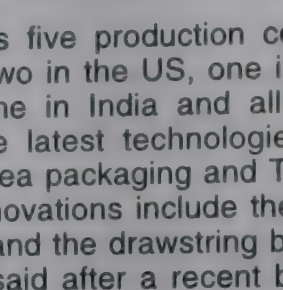
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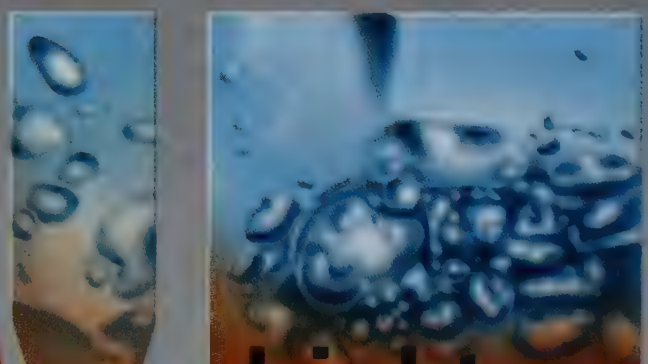

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INDIAN Food INDUSTRY
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Indian Food Industry (IFI), a bi-monthly technology and trade journal, has been serving the information needs of food professionals in India since 1981. With its state-of-art technology reviews, informed views on industry issues and wide coverage of market developments, IFI has come to be widely respected by its readers consisting of food technologists, engineers and scientists, managers, consultants, policy makers, students and all those in industry, academia and government with a stake in Indian food industry. Now, on 20th year of its publication, IFI has been thoroughly restructured to make it more responsive to the needs of food industries in the country, be in tune with the new millennium and become a leader in its class of journals. In fact, IFI is gearing up to set new benchmarks in production quality, content and delivery.

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IFI is published by the Association of Fo Scientists & Technologists (India), AFST the only professional body dedicated to t advancement of food science and techn logy and development of food industries the country. Established in 1957 and affiliated to the Institute of Food Technolo gists (USA), AFST(I) has over 3,000 members spread over 23 Chapters. AFS also publishes an internationally recogni R&D journal, *Journal of Food Science & Technology*. Other major activities of AFST(I) include organising IFCON, the International Food Convention every five years and ICFOST, the Indian Convention Food Scientists & Technologists every tw years, both usually coupled with FOOD-EXPO. AFST(I) also confers prestigious Awards and Fellowships annually on emi nent achievers in the field. All this gives a pedigree that is essential to deliver qua content and maintain exacting standards.

For Subscription details, contact
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INDIAN
TRADE FAIRS & CONFERENCES

AGRI INTEX 2001
Venue: Coimbatore, Tamil Nadu
Date: 1-7 August, 2001

Tamil Nadu Agricultural University in association with Coimbatore District Small Industries Association (CODISSIA) which enjoys support of over 40,000 industries, is organising Agri Intex 2001, an international agricultural exhibition which aims to highlight development, growth and opportunities in modern agriculture and all related activities of rural, national and global nature.

Agri Intex 2001 will be the meeting point for the lead players in their respective fields to launch and market their products, technologies, expertise and services through interaction with large variety of domestic and international participants and visitors.

The Exhibition is to be held at the Codissia Trade Fair Complex dedicated to the nation by Prime Minister A.B. Vajpayee on February 4, 2001.

For more details contact:

Agri Intex 2001, Codissia Trade Fair Complex, G.V. Fair Grounds, Avinashi Road, Coimbatore 641014. Tel: 91-422-593505, 593507, Fax: 91-422-593506, Email: cointec@vnsl.com, Website: www.industrialtradefair.com

KISAN 2001
Venue: Bangalore
Date: 18-21 October, 2001

India's largest agri show **Kisan** 2001 will be held at Bangalore. At **Kisan**, the farmer is the focus. Today's farmer is more knowledgeable and more demanding than ever. The need for information brings them to **Kisan** exhibitions. As the largest agri shows in India, **Kisan** offers an overview of the latest products, services, research and development, technology advancements, trade news and business opportunities in Agriculture.

Kisan is an opportunity to start a dialogue and establish a fruitful relationship with the farmer and agri trade at large.

For more details contact:

Deccan Exhibitions Pvt. Ltd., No. 57/2, 11th Main Road, Malleshwaram, Bangalore 560 003, India. Tel: 080-3316330, 98451-72383, Fax: 080-3316330, Email: bhavani@ kisan.com, 1170/17B, Shivajinagar, Pune 411005, India. Tel: 91-20-553600, 5537434, Fax: 91-20-5536301, Email: fair@kisan.com

FOODTECH 2001
Venue: Kolkata
Date: Sept. 28 – Oct. 1, 2001

FoodTech India 2001 is organised by Intech Trade Fairs Pvt. Ltd. and sponsored by Department of Food Processing Industries, Government of West Bengal.

The need of the hour is development of food processing and preservation technology to avoid wastage due to perishable nature of foodstuffs. **Foodtech India 2001** aims at highlighting the technologies and equipment for this purpose, as well as the variety for foodstuffs and beverages available in the country.

Scope of the Exhibition: • **Food:** All kinds of Food products and Beverages • Dairy products, Soft Drinks, Mineral Water, Health Drinks, Fruits, Vegetables and Nutritious Food (Processed/ Packed) • **Food Ingredients:** Food Grains, Edible Oil, Spices. Essences, Coloring and Additives and Readymade Masala, Dry Fruits, etc. • **Machinery & Equipment:** Food Processing, Food Packaging, Food Preservation and Storage, Cold Storage Systems, Refrigeration, Dispensing Equipment, Air and Water Pollution Control Equipment • **Kitchen & Domestic Appliances:** From Ovens, Grills, Mixers etc. to Soda Makers, Microwaves etc. • **Hotel & Restaurant:** Equipment and Table Wares • **Facilitators:** Banks and Financial Institutions, R & D Institutes, Trade Associations, Govt., Agencies, Export Promotion Councils, etc.

For more details contact:

Intech Trade Fairs Pvt. Ltd., 307-308, 3rd Flr., Acme Indl. Park, Off. I.B. Patel Road, Near W.E. Highway, Goregaon (E), Mumbai 400 063. Tel: 878 0370 / 71 / 72, Fax: 022-6902392 / 93, 8780375, Email: intech@bom5. vsnl.net.in

3RD IDFT EXPO 2001
Venue: World Trade Centre, Mumbai
Date: 21-24 November, 2001

The 2nd IDFT Expo held from October 3-6, 2000 at Pragati Maidan, New Delhi was hailed as a grand success by decision makers, dignitaries, industry leaders, scientists, diplomats, farmers and others. Excellent business results were reported by the participants, quite a few joint venture proposals were initiated and long term business transactions were generated.

The 3rd IDFT Expo is being organised jointly with KMI, Germany, the largest trade fairs organiser on agriculture in Europe in association with TAFCON DLG-German Agricultural Society, Germany will sponsor the event with co-sponsors All-India Food Processors' Association, All-India Ice Cream Manufacturers' Association, All-India Bread Manufacturers' Association and Federation of Biscuit Manufacturers of India.

High power German Government and Trade delegations have planned to visit the Expo. Germany will put up a national pavilion displaying the technological and innovative advances made by food processing and dairy industries of their country.

Satellite Programmes like Technical Seminars on Dairy and Food Processing Industries have been planned. Leading experts from overseas and India will address the visitors and delegates from overseas and neighbouring countries.

Liberalisation and globalisation of economy makes India a very attractive and profitable destination for overseas business community and in this context, the Expo offers huge potential for: Joint ventures, Investment, Export and Import tie-ups, tie-ups for latest technologies and practices, state-of-the-art equipment and machinery, technical consultancy, business tie-ups, promotion of products, and so on.

For more details contact:

Tafcon Projects (India) Pvt. Ltd., C/60, Nizamuddin East New Delhi. Tel: 435 21 41/44/82/84, Fax: 011-435 52 15, 435 40 77, Website: http://www. tafcon.com, Email: tafcon@del2. vsnl. net.in

FOODPRO 2001
Venue: Chennai
Date: 8-11 December, 2001

Organised by Confederation of Indi-

an Industry (CII) **FOODPRO 2001** – India's flagship & premier Food Business Event is a comprehensive business fair featuring a 4-Day International Exhibition & Conference on Food Industry, and will highlight and showcase the tremendous opportunities across the entire Agricultures, Food and Dairy Chain.

FoodPro 2001 – The Highlights:
• 4-Day International Exhibition • Conferences & Investment Seminars • Technical Sessions & Technology Forums
• Parallel Events & Food Festivals
• Exclusive State Government Pavilion
• 150+Exhibitors.

FoodPro 2001 – Opening Markets: Market opportunities across the entire Agri/Food chain by way of Investments, Joint Ventures, Technology Transfers with Indian Companies or Exporting to India for • Modernisation of the Food Chain • Agri-Inputs (High Yielding Seeds, Processing Varieties) • Agriculture (Farming Techniques, Inputs, Basic Mechanism) • Procurement & Storage (Material Handling, Packaging, Cold Chains, Transportation, Grading Systems) • Processing (Large Scale Facilities, Processing and Packaging Machinery & Technologies) • Retailing (Cold Chains, Retail Outlets) • Exports of Food & Agricultural Products including Processed & Packaged Foods.

The **FoodPro 2001** Exhibition will attract all the players in the Agriculture, Food, Dairy Businesses from all over India including Food Processors, Retail Chains, Hotel & Restaurants, Importers who would be using the Exhibition as a forum to source new Technologies, Equipments, Packaged & Processed Food and Dairy Products as well as fresh agro producers.

Exhibition Profile: Technologies, Equipments & Systems: Food Processing Equipment, Preservation Systems, Refrigeration Technology, Packaging Systems, Beverages, Processed Frozen Foods, Dairy Equipment & Technology, Dairy Products, Poultry Equipment and Technology, Poultry Products, Automation & Control Systems for Food Processing Equipments, Printing & Packaging, Storage and Handling Asceptic Facilities.

Food Products: Processed & Frozen Foods, Packaged Foods, Beverages – Tea, Coffee, Alcoholic & Non Alcoholic Beverages. Dairy Products Milk, Butter, Ice Cream, Cheese, etc Horticulture Products.

FoodPro 2001 Conferences: CII will be organising a host of International Seminars and Conferences in areas such as bio-technology, water management, food processing, livestock, cold chain technologies, IT & agriculture, agri-infrastructure, agro-packaging, WTO & agriculture and food laws.

Brand New Exhibition Venue: The FoodPro 2001 Exhibition will, for the first time, be held at the ITPO Chennai Trade Centre – the Region's largest as well as Newest Exhibition Centre.

For more details contact:

Confederation of Indian Industry
Business Fairs Division, 35/1
Abiramapuram, 3rd Street, Alwarpet
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7648, 466 0571, 466 0291, 466 0773
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INTERNATIONAL
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PRINT + PACK EXPO 2001
Venue: Hong Kong
Date: 29th Aug. - 1st Sept., 2001

Organised by Business and Industrial Trade Fairs Ltd., **Print + Pack Expo 2001** is the largest and most sophisticated exhibition for printing and packaging industry being held regularly for the last fifteen years. It incorporates the 2nd Asian Sign Technology & Materials Exhibition and The International Graphic Arts Technology for Asia.

Print + Pack Expo is dedicated to the prosperous printing and packaging industries in Asia. It aims to bring together the world's latest technologies for the Asian printing and packaging market and will be the best market place for international suppliers and buyers.

On current events 30,000 international visitors are expected from 34 countries at the exhibition.

Concurrent events: Print + Pack 2001 is one of the highlights of the 2001 **Asian Industrial Expo**. Concurrently held under the roof will be The International Machine Tools and Metalworking Machinery Exhibition for Asia, and The International Auto Parts, Accessories, Maintenance and Inspection Equipment Exhibition, which are going to demonstrate a full spectrum of up-to-date industrial technologies and equipment.

Exhibits: Pre-press and post-press technology, printing machinery and materials, industrial printing machinery, screen/pad/hot-stamp printing, printing services, paper converting, binding equipment, packaging machinery and materials, and ancillary equipment, signs and sign making equipment, accessories and substrates, graphic arts software, desktop publishing technology, CTP, DTP, electronic and multimedia publishing technologies, flexographic printing supplies, printing materials and accessories, etc.

For more details contact:

Mr. Brian Leung, Business & Industrial Trade Fairs, Unit 1223, 12/F, HITEC, 1 Trademart Drive, Kowloon Bay, Hong Kong, Tel: 852-2865 2633, Fax: 852-2866 1770, 2865 5513, Email: enquiry@bitf. com.hk

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DRINKTEC - INTERBRAU 2001
Venue: Munich
Date: 20-27 September, 2001

Drinktec - Interbrau 2001 is the world's largest fair for beverage technology featuring latest technology for manufacturing, bottling and packaging beverages of all kinds through to liquid foods.

The exhibition will present innovative beverage filling technology and innovative packaging solutions. It will also reflect the growing significance of non-alcoholic drinks, their world wide markets and the technology to serve these markets. All the latest technologies in manufacture, bottling and packaging of drinks of all kinds, through to liquid food, will be presented at **Drinktec-Interbrau 2001**. Entire systems and large-scale machinery will be set up at the fair to demonstrate the products in action.

The Product range spans the entire repertory of the beverages industry. The key areas are: • Machinery and plant for malting and beer production and for the manufacture of alcoholic and non-alcoholic drinks • Filling and packaging machinery and labelling, storage, consignment and transport technology • Filtration and separation technology, measurement technology, process automation and control technology • Automation and new software solutions for all manufacturing and business processes • Packing materials and packing aids • Energy and water supplies, raw materials and raw material products • Fittings for hotels and restaurants.

For more details contact:

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LABELEXPO EUROPE 2001
Venue: Brussels, Belgium
Date: 26-29 September, 2001

Organised by Tarsus Martex a part of Tarsus group Plc, the **Label Expo Europe 2001** will be showcasing new developments in narrow web printing including flexible packaging, folding cartons and digital printing.

Among the many new highlights of **Labelexpo Europe 2001** will be the 'visitor trails'. The marked trails will be used to direct visitors to the stands for flexible packaging, folding cartons, digital solutions, labelling solutions and converting solutions. This will make it

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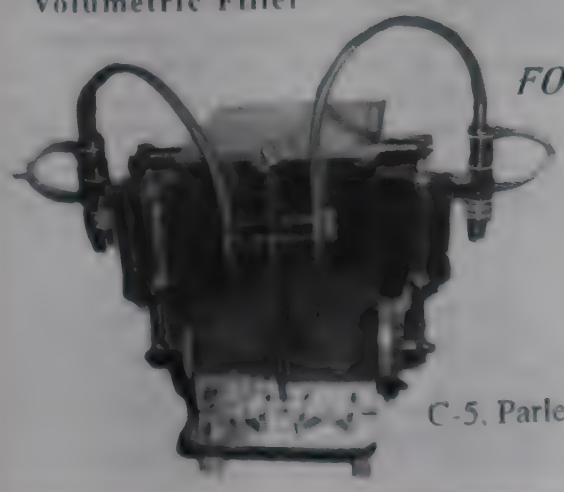

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easier for visitors to find their way around this extensive event. Educational seminars are an added feature to the **Labelexpo Europe 2001** exhibition.

About 390 companies are expected to take part in this event.

For more details contact:

Gillian Pattison, Press Officer., Tel: 44(0)20 8846 2700, Email: gpattison @tarsus.co.uk, Joanne Watts, Press Officer., Tel: 44(0)20 8846 2743, Email: jwatts@tarsus.co.uk

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ANUGA - 2001
Venue: Cologne, Germany
Date: 13th - 17th Oct., 2001

Anuga 2001 is the world largest trade fair for food and drink industry.

Over 40 Indian companies are expected to take part in Anuga. A large number of Indian businessmen from states of Maharashtra, Delhi, Tamil Nadu, Kerala, Karnataka, Punjab, West Bengal and Assam will visit the fair to explore new business avenues. In order to improve India's export prospects, India Trade Promotion Organisation will be putting up an Indian Pavilion to showcase exclusive Indian products such as spices, cashew nuts, tea and coffee, marine products as well as processed food items.

Over 6000 suppliers from 100 countries will be on hand at Anuga to exhibit a unique range of products covering almost all areas of the food and drinks industry. Over 2 lakhs visitors are expected from 152 countries. The fair will also showcase the latest technology and services for the grocery trade, the catering sector and the vending trade.

Discussions, presentations and workshops offered in the supporting programme will all be oriented towards current trends and topics in the industry, exotic influences are having a substantial impact on current food trends for Indian business, Anuga is the perfect place to establish vital contacts with business partners around the world.

For more details contact:

Indo-German Chamber of Commerce, Maker Towers 'E', 1st Floor, Cuffe Parade, Mumbai 400 005. Tel: +91-22-2186131 (9 Lines), Fax: +91-22-2180523, Email: igcc@giasbm01.vsnl.net.in

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WORLD FOOD MOSCOW 2001
Venue: Krasnaya Presnya, Moscow
Date: 25-28 September, 2001

World Food Moscow 2001, Russia's Premier International Food & Drink Exhibition and the largest of its kind is organised in Russia by ITE Group Plc. the world's leading exhibition organiser in emerging markets. Over 525 exhibitors from 44 countries are expected to take part in the exhibition. The exhibition will provide agateway into the vast and emerging food markets of Russia.

For the first time **World Food Moscow** will be co-located with **Sweets Expo Moscow, the International Sweets and Confectionery, Biscuit and Pastry Exhibition,** which has attracted confectionery Associations from countries including Brazil, Spain and Poland.

ITE Asia Pte Ltd. is now organising participation of Asian companies at **World Food Moscow 2001**.

• Cocoa, Chocolate and chocolate confectionery • Biscuits, cakes and waffles • Crackers, salted cookies, snacks • Sugar confectionery, marzipan articles, filled sweets, caramel • Semi-finished cake ingredients • Children's confectionery • Diabetic and diet articles • Technology • Flavours, colourings, additives used in confectionery.

For more details contact:

Loy Joon How, Gen. Manager, ITE Asia Pte Ltd., 89 Short Street, #B-11, Golden Wall Centre, Singapore 188216. Tel: 65-3360655, Fax: 65-3379005, Email: joonhow@pacific.net.sg

SIAL ASIA 2001

SIAL ASIA 2001, the second International Food, Beverage, Wine & Spirits Exhibition for Asia held at the Singapore Expo from 5-8 June, 2001, attracted an overall visitor traffic of 6,727 trade visitors from 60 countries around the world — surpassing its 1999 figure of 6,100 trade visitors. According to an exhibitors and visitors survey, concrete sales leads worth an estimated US $7 million were immediately generated on the sales floor.

Commenting on the latest survey results, Ms. Angeline Tok, General Manager of SIAL ASIA Pte Ltd. said, "Total sales leads are definitely much more and could well be double this figure as many exhibitors could not immediately quantify the potential sales volume arising from contacts made at the exhibition."

Adds Mr. Gilles Vaucelle, President of SIAL ASIA Pte Ltd., "Our exhibitors are reaping the full benefits of meeting more and better quality trade visitors this year, than ever before, due to SIAL ASIA's growing reputation in the Asian market.

The majority of trade visitors came from the Asia Pacific, with Singapore and Malaysia registering the highest number of trade visitors, followed by Australia, Thailand, the Philippines, India and Korea. SIAL ASIA also attracted trade visitors from regions far and wide — from South America to Europe, Scandinavia, Africa, the Middle East and even Russia.

Visitors delegation include groups from Australia, Argentina, Brunei, Malaysia, Mexico, Thailand, and other countries. Among the specially invited guests were government and trade officials - comprising top executive and officials from Thailand's flour industry sector; as well as a team of trade officials and business leaders from various provinces in Argentina, who came to the exhibition to explore business opportunities in the food sector.

Active product demonstration and business negotiations on the exhibition floor were evident, as the trade visitors strolled through Halls 3 and 4, viewing and assessing the products of more than 300 companies from 30 countries.

Exhibitors expressed satisfaction with the quality of visitors and business generated at SIAL ASIA.

The active food market in Southeast Asia was a pleasant surprise to first time exhibitors to SIAL ASIA. Said US exhibitor, Mr. Gary Ohlgart, Director of International Sales for Beef Jerky Link Snacks Inc., "This is an excellent show, with a very qualitative audience, showing real interest. Our main intention for coming to SIAL ASIA was to understand the market in Southeast Asia and to find out which product mix would work, to the type of product lines we should look at, including the packaging and pricing."

SIAL ASIA's two supporting seminars on Food Safety and the HT Global Standard[cm] for Halal foods also attracted a total of 63 key players from the food and catering sector. Ms. Cindy Goh, a delegate from SATS Catering found the Halal Seminar extremely useful. "We are thinking of introducing a range of Halal beverages and wanted to find out more about the concepts and requirements of halal and the new global standard. The seminar has really enlightened our understanding of the Muslim food market and its potential."

The seminar on Food Safety attracted much discussion as well as coverage from the international media. Says Mr. Frankie Lo of Bahagia Distributors, Brunei, "The seminar gave me a better idea of the issues and developments in food safety today. It is valuable and timely because the authorities in Brunei are stepping up on regulations on food handling and safety.

SIAL ASIA will return to Singapore from 2-4 July 2003. Booking for exhibition space are available now.

For more details contact:

Ms Angeline Tok, General Manager, SIAL ASIA Pte Ltd., 20 Kallang Avenue, 2nd Flr., Pico Creative Centre, Singapore 339411.Tel: (65) 3929269, Fax: (65)3929260, Email: kctok@pacific.net.sg

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We are the manufacturers of Transparent & Opaque White Injection moulded plastic containers ranging from 100ml to 2000ml. These containers are Airtight, Food Grade, Micro-Waveable (for re-heating), Deep Freezable, Stackable & available in various shapes. It has multipurpose utility & used in Industrial & Food packaging Industry.

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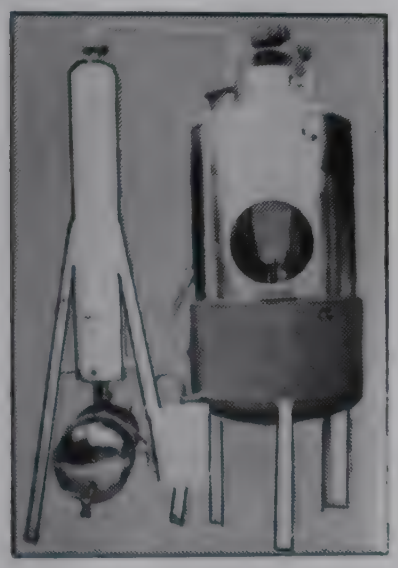
Manufacturers of Food Products Equipment & Fabricators



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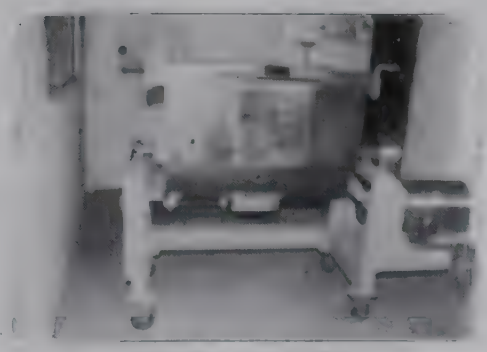

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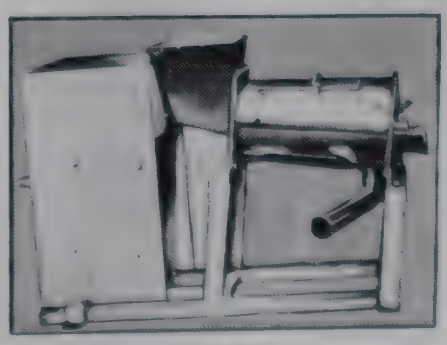

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Thane-Belapur Road, Behind Savita Chemical,
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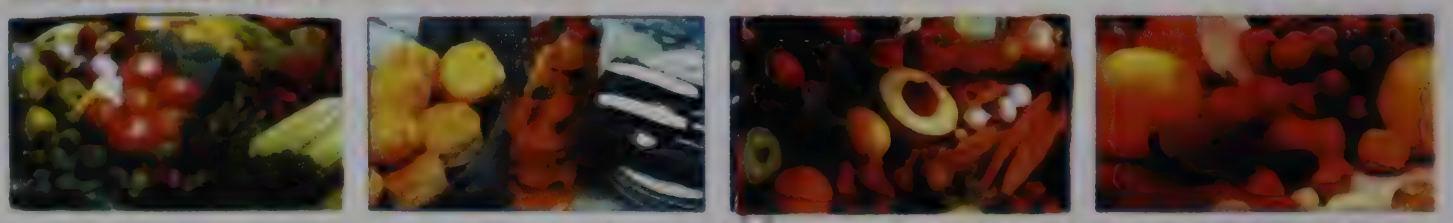

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PRODUCT REVIEWS

POLYCARBONATE BOTTLE BLOWMOULDING

Uniloy Milacron engineers the clear choice for cost-efficient blowmoulding of 3 to 6 gallon (11.35 to 22.70 liter) polycarbonate bottles and containers. Optimized for polycarbonate processing, the new RS13500 P/C applies state-of-the art technologies - exclusive top-fed PC head, fully-packed smooth ID neck, high-tonnage clamp systems, and integrated trimming - to the proven economies and reliability of the RSI reciprocating machine platform. The versatile workhorse machine produces high-strength bottles with or without handles to high consistent quality on aggressive cycle times. Created specially for polycarbonate processing, a unique top-fed head optimizes quality, output and uptime. Top-fed, direct-flow design improves parison clarity and reduce chances for material degradation and burning, while minimizing rejects and downtime for head disassembly and cleaning.

An advanced Siemens control provides 128 point parison programming to assure precise wall-thickness control with finite neck profiling and pack-out. Smooth ID neck finish enables cap seal on both ID and top lip to minimize leakers and allow possible use of a less expensive cap.

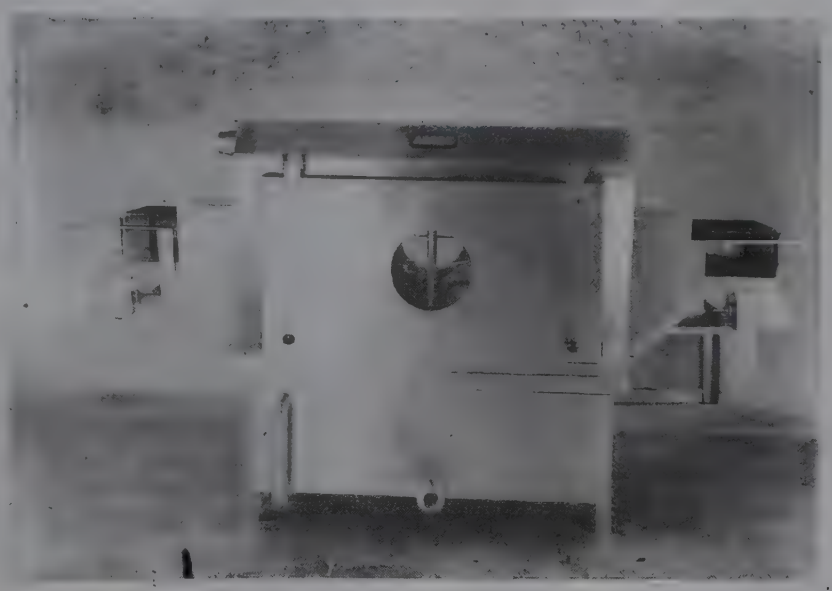
A high-tonnage clamping system creates stronger parting line welds, reducing product loss to drop test failure. The toggle clamp system uses mechanical lock-up with Rotac actuator to generate 90 tons of clamping force. The clamp design uses 40% fewer parts than shuttle technology, reducing maintenance costs.

The RSI machine platform brings to polycarbonate containers proven performance with exceptional cost effectiveness in many blowmolding applications. Automatic, integrated transfer and trimming reduce labor burden, accident potential, and space requirements. The bottle is automatically removed from the trimmer and oriented with neck finish up, ready for annealing.

For further details, contact:

Uniloy Milacron
10501 Highway M-52
Manchester, MI 48158
Tel: 734-428-2339, 734-428-8371
Fax: 734-428-1165
Email: adinfo@uniloy.com

HIGH PRESSURE CRATE WASHER



Goma high pressure crate washer has been successfully working in various industries. The crates/trays are washed thoroughly by high pressure water jet only. There is no requirement of steam, detergent, chemicals etc. The machine is more compact and with minimum maintenance.

The crates/trays are conveyed automatically by conveyor chain fitted on stainless steel fabricated frame. The crates/trays pass through high pressure water jet nozzles having accurate spray angle for washing. The high pressure is generated by a high pressure pump driven through electric motor and mounted close to conveyor. The speed of conveyor is variable and can be adjusted to get optimum washing effect. The washing process is carried out inside the stainless steel fabricated enclosure which prevents all egress of water. The enclosure has a provision for easily openable doors for maintenance purposes. Waste water is collected in a pump which can be connected either to the sewage system or can be reused passing through the special filtration system. The whole machine is provided with adjustable feet for levelling and needs no fixing to the floor. A separate electrical control panel is provided.

Advantages:

• Fully automatic • Ensures optimum cleaning in the fastest possible time • Compact design for space saving • Time and man power saving • No need of steam, chemicals, detergents etc. • Low power consumption • Easy for operating and maintenance

For further details, contact:

Goma Engineering Pvt. Ltd.
Behind Universal Petrol Pump
Majiwada, Thane - 400601
Tel: 91-22 5340875/5346436
Fax: 91-22 533 3634/2
Email: goma@vsnl.com
Website: www.gomaengg.com

ULTRAVIOLET WATER DISINFECTION SYSTEM

Ultraviolet Water Disinfection System using the latest US based Teflon® Technology is the ultimate answer to prevent pollution and contamination in water. Non-fouling Teflon® Tubes UV units for water and waste water treatment are used to over come scale problems.

These units find application in disinfection of drinking/process water, pre-treatment before R.O., algae and slime control, purer fermentation products. The system can also be used for various industrial applications such as supply of high purity water for beverage, bottling, brewing pharmaceuticals, food processing etc. It achieves near cent percent water purity without any side effects. It is also cost effective and maintenance free.

Among the products offered are various models of water disinfection systems, ranging from 225 LPH to 12 Lac LPH of UV systems, micron filters, carbon filters, air irradiators etc.

For further details, contact:

Hitech Ultraviolet Pvt. Ltd.
P.O. Box. No. 8356
35, Grace Plaza
S.V. Road, Jogeshwari (W)
Mumbai 400 102
Tel: 6790610, 6794611, 6794327
Fax: 6794337
Email: hitechuv@bom5.vsnl.net.in

SODIUM BENZOATE

Sodium Benzoate, well known preservative is manufactured by Ganesh Benzoplast Ltd. in their state-of-art plant at Tarapur, Maharashtra. Benzoic Acid is manufactured from oxidation of Tolueno, only route which gives food grade quality, and conforms to the 154467-1554 of Bureau of Indian Standards. The quality is checked regularly by their representative and GBL is the only company in this country, which manufactures food grade quality in form of powder, flakes and granules.

As per prevention of food adulteration act 1954, Sodium Benzoate falls in class 2 preservative and its use is recommended in fruit and vegetable juice, fruit pulp, beverages, squashes, crushes, fruit syrups, jam, jelly, marmalade, mineral water, pickles, chutney, tomato sauce and puree and pastes.

Its other applications are also being tested at shop floors, preservation of fish, spices and cakes are also new fields for sodium benzoate. GBL holds a ISO 9002 certificate and exports Sodium Benzoate to various developed countries like USA, UK, France, Germany etc.

Fumaric Acid, Acidulent and Anti-oxidant, is manufactured by Ganesh Anhydride Ltd., at their state-of-art plant at Tarapur. GAL manufacturers Maleic Anhydride under the same roof and converts it to Fumaric Acid.

There are many manufacturers of Fumaric Acid but it is bye-product of their Pthalic Anhydride plant. GAL manufactures food grade quality as per IS:6793:72 of Bureau of Indian Standards.

Fumaric Acid (food grade) is also recommended by PFA94 in fruit juices, tomato juice, fruit syrup, squashes, tomato sauce ketchup, jam & marmalade and various fruit/vegetable sauces. The taste of Fumaric Acid is very near to tamarind and is being used in sambhar by many Southern Hotels.

It remains as free flowing powder and retains original flavour while citric acid absorbs moisture and frozen lumps. Its efficiency (sourness) is higher then citric acid, 3 parts by weight of citric acid is equivalent to 2 parts of fumaric acid.

This makes it a very cost-effective ingredient for various food receipes.

For further details, contact:

Ganesh Benzoplast Ltd.
Ganesh House
Marol Naka
Andheri (E), Mumbai 400 059
Tel: 8502096 • Fax: 91-22-8505529
Email: rkpl@vsnl.com
Website: http://www.ganeshgroup.com

VACUUM TRAY DRIER

Magumps, a well-known name in the field of pharmaceutical bulk drug process industries for high quality equipment and plants now introduces Vacuum Tray Dryer useful for rapid drying of material sensitive to heat and oxidation. This dryer can be used in fine chemicals, food and pharmaceutical industries and are available in standard/GMP/CGMP constructions, with different sizes/capacities i.e. to hold 12 / 24 / 48 trays of 800 x 400 x 50mm size. The Dryers are specially designed so as to withhold full vacuum (700 Hg with only a drop of 75mm/ 24 hrs.) The main chamber of the drier is made out of thick S.S. plate, which are fully welded by argon arc process with heavy duty M.S. stiffeners as well as light and sight glasses are provided from outside. The heating is done with hot water or low pressure steam which is circulated through the shelves fitted inside the dryer. The heating shelves are designed ensuring 100% flat surface for effective heat transfer through thermal conduction with the S.S. Trays. These shelves are hydraulically tested at pressure of 5kg/cm. Sq. The door is swing type on heavy hinges and is fabricated from thicker S.S. plate having nut and bolt with wheel arrangement all across to ensure 100% tightening the chamber ensuring no leakages. The gasket on the door is foodgrade neoprene rubber.

The dryers are provided with condensor and receiver. The condensor is designed for effective heat transfer area with all contact parts made out of S.S. and the tubes manufactured of seamless pipe. The Shell of the Condenser is made of MS.

The receiver is manufactured with S.S. contact parts with sight/light glass and is in two parts so that the condensate can be collected effectively during the operation. All the flanges used are of ASA-150 design. The dryer can be supplied complete with S.S. trays, vacuum pump (optional) temperature controller cum indicator (optional).

For further details contact :

Magumps
Trisandhya 'A'
97, D. Phalke Road
Dadar (East)
Mumbai - 400 014.
Tel: 411 3572, 415 4474
Fax: 022-413 7648 / 8307
E-mail: magumps@bom5.vsnl.net.in.

BAKERY INGREDIENTS

ALPHAMALT BX Series is now available in India. It is used as a flour in place of improver Bromate. Alphamalt BX ensures a high level of fermentation stability even with extremely long proof time. It gives a good volume yield even if fat and sugar contents are high. BX tablets are also available which conform exactly to the formulation and dissolve rapidly in the water used in making the dough.

The other ingredient now available is "EMC Evit-PA" used by the Pasta industry. EMC EVIT PA has a natural preparation whose complex stability of the weak gluten network of the soft wheat which enhances the cooking potential sensory properties of the pasta. Addition of 2 to 3 percent of the product, based on the quantity of flour makes it possible to achieve the level of durum wheat.

For further details, contact:

Maharashtra Traders
(The Palani Group of Co's.)
207, Oberoi Trade Centre
Oberoi Complex, Off Malad Link Road
Near Laxmi Industrial Estate
Andheri (W), Mumbai 400 053
Tel: 6330974/0976/0975
Fax: 6325871/7941, 6361604
Email: palani@bom3.vsnl.net.in
URL: palanigroup.com

ION EXCHANGE RESINS

Doshi Ion Exchange and Chemical Industries Ltd., one of the leading water treatment companies engaged in the business for over 18 years manufacture a wide range of Cationic and Anionic Ion Exchange Resins for water and non-water applications. The company offers a complete range of Water Treatment Plants such as Softners, Demineralisers, Multi Grade Filters, Dealkalizers, Degassifiers.

Doshi Ion also offers Reverse Osmosis Plants for sea water, brackish and waste water treatment, using DOW Film Tec-USA which make TFC Membranes. Doshi Ion offers custom built plants to suit the customer's requirement of both quality and quantity. The company also offers pre-engineered standard packaged units.

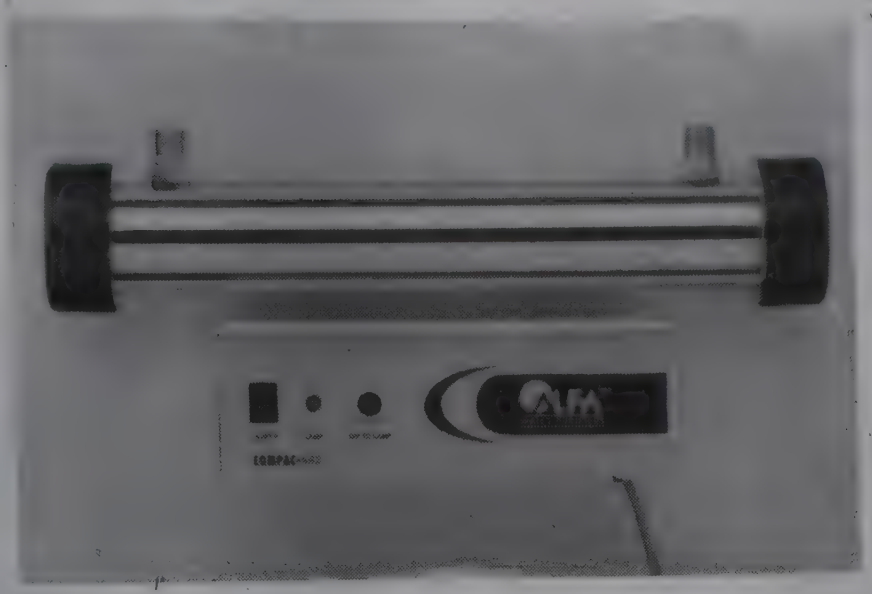
Dosh Ion has tied up with CELGARD, GmbH - a member of the Hoechst group of companies for their special membrane product. Using these most modern state of art membranes, Doshion designs and supplies systems for various applications viz. Fruit juice Concentration/Clarification, Sugar deashing, Beer/Wine purification, Bacteria Pyrogen removal, Milk/Whey concentration, Ultra high purity system.

Whatever your water management needs from analysis to turnkey systems, Doshiion offers a single source expertise in all areas with single sources responsibility.

For further details, please contact:

Doshi Ion Exchange & Chemical Industries Ltd.
24, 25, 26, Phase-II
G.I.D.C. Vatwa
Ahmedabad 382445
Tel: 5831136, 5891916
Fax: 91-079-583 3302

WATER PURIFICATION SYSTEMS



Ace Hygiene Products is amongst the leading manufacturers of ultraviolet water purification systems in the country with an experience of over one-decade in the field. They specialise in process water applications where bacterial disinfection of process water, which is used in manufacturing and washing areas, is of utmost importance.

The Alfa AP-Series models are capable of purifying water from 100 to 1,00,000 litres/hour based on customer's specific needs.

The Alfa systems use the principle of Ultraviolet light to purify water without the addition of any chemicals or heat. High intensity germicidal lamps totally inactivate water borne bacteria, viruses and path-ogenic microorganisms.

Alfa water purification systems find wide application where bacteria free water is required and is ideally suited for food industry, hospitals, bottling plants, pharmaceuticals, and drinking water systems and for process water in industries.

The unique advantage of the Alfa UV systems is that they offer an optional **On-Line Fail-Safe validation** with the help of the Alfa Sensor which is an Ultraviolet Monitor to ensure proper disinfection efficiencies, thus making the UV system Reliable and Effective.

They are experts in sizing the customer's requirements and offer professional solutions to bacterial disinfection problems in the process industry using the UV principle.

They have successfully catered to a wide and impressive customer list, that includes firms like Pepsi, Parle, Kwality Biscuits, Naik Sea Foods, Libran Sea Foods, Gausia Foods. Pfizer, Bayer, Johnson & Johnson, Jaslok Hospital, Bombay Hospital etc.

They will be able to provide a suitable solution to your bacterial problems in water if you send them details like feed water quality, quantity of water to be purified per hour and specific application along with a sketch of the piping layout.

For further information, contact:

Ace Hygiene Products
222, Shah & Nahar A-2
Lower Parel, Mumbai 400 013
Tel: (022) 494 5957, 495 4190
Fax: 91-22-495 4250
Email: ho@alfa-india.com
Website: www.alfauv.com

CRATES AND CONTAINERS

Prince Multiplast (formerly known as A-1 Plastics) is one of the largest plastics processors in India. They have developed capabilities in manufacturing Injection Moulded Bottle Crates, Material Handling Crates as well as Blow Moulded Packaging Containers.

Prince Multiplast is an ISO 9001 certified company by Quality Assurance Services, Australia. Some of its customers are Coca Cola, Pepsi and Cadbury for its plastic crates while its blow moulded containers are sold to the likes of Gulf Oil, National Dairy Development Board and Indian Oil Corporation. The company's products are seen virtually in every state of the country.

Continued quality improvement is a way of life at Prince Multiplast from designing development, manufacturing, inspection, testing, production to distribution and customer service. Prince Multiplast has also ensured that product design and manufacturing processes are eco-friendly to avoid wastages.

Prince crates are injection moulded in high grade plastics. Available in a wide range of design and colours, they are odourless and resistant to acids, alkali solutions in common use and are non-toxic. They can be screen printed and embossed with the customer's name and logo and have excellent stability and stacking capacity. These strong and durable crates are used in variety of industries like Fisheries, Hatcheries, Vanaspati, Edible Oils, Ice Creams, Frozen Desserts, Soft Drinks, Beverages, Breweries, Textiles, Automobiles, Farms (Floriculture, Horticulture or an Orchard). Bakeries and many more.

The company produces a wide range of blow moulded articles from 0.5 ltrs. to 30 ltrs., which enables the company to be a one stop shop for its customers who need different sizes of containers. The various functions consisting of product design, development, manufacturing, testing, storing and supply are done under one roof which enhances the co-ordination and quality and hence, better services for valuable customers. The industries which use the company's containers include edible oil, lubricant oil, chemicals, pharmaceuticals and household liquids.

The Computer aided designing centre, with its well equipped Testing Laboratory, modern manufacturing facilities and a team of skilled, dedicated personnel, enables the company to satisfy the customer's needs at all times.

For further details, contact:

Prince Multiplast Pvt. Ltd.
Amar House, Plot No.103
Road No.12, Marol MIDC
Andheri (E), Mumbai 400 093
Tel: 91-22-8363600/01/02/03/04
Fax: 91-22-8360404/0088
Email: sales@princemultiplast.com
Website: www.princemultiplast.com

FOOD CHEMICALS

S.A. Chemicals with a global vision in mind has been surging ahead at an impressive speed to service the ever increasing needs of its customers. Qualified promoters, professional marketing team, emphasis on quality, effective after-sales service, timely and prompt dispatches and cost effectiveness are the company's trademarks.

Sorbitol, available in abundance from fruit like black grapes, apples, plums, cherries, pears, finds application in foods and beverages such as candies, drinks, cereals & snacks etc.

Dextose, a monosaccharides sugar finds application in food and beverages like jams, jellies, icrecream, chewing gums, meat, beer etc.

Liquid Glucose known as Glucose or Corn Syrup finds application in confectionery, bakery products, ice creams, etc.

Malto Dextrin (Spray dried) used in infant food/feed supplements, beverages, bakery and snack foods, dairy, confectionery, dry mixes, sauces and salads, is a spray dried product.

Other Corn based products and Modified Starches from S.A. Chemicals are: Refined Corn Oil, Maize Gluten. Corn Steep Liquor, Dextrin, Oxidized Starch, Starch Ester.

Besides the above, S.A. Chemicals supply Casein, Folic Acid, Sodium Hydrosulphite, Calcium Carbonate, Lactose, Ascorbyl Palmitate, Calcium Gluconate, Whey Protein Dairy Blends, Distilled Monoglycerides.

For more details, contact:

S.A. Chemicals
220 Udyog Bhavan, Sonawalla Road
Goregaon (E), Mumbai - 400 063
Tel: 8764700 • Fax: (022)8769532
Email: sac@sachemicals.com
Website: http://www.sachemicals.com

FOOD PROCESSING MACHINERY

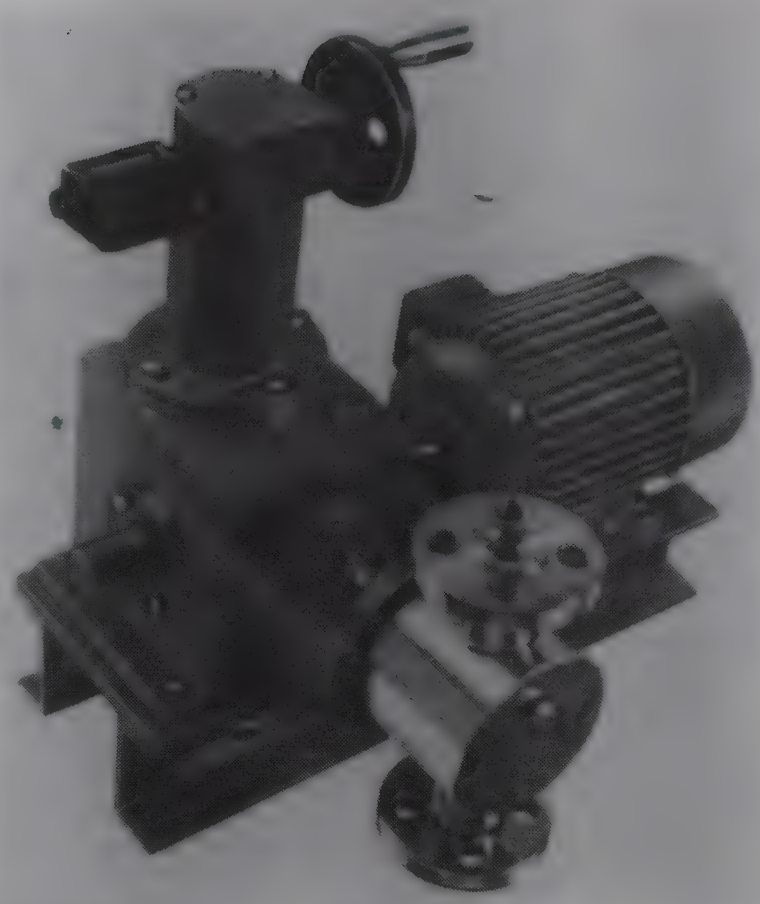
Bombay Industrial Engineers is a reputed company for manufacture of various food processing machinery like Pulpers, Juice Extractors, Steam Jacketed Kettle, Fruit Slicers/Crushers, Mango Cutters and Canning retorts, Hot/Cold Liquid Slicing Lines, Bottle Closing Powder Filling and Form Fill Sealing Machines.

They also manufacture Dryers, Tray, Tunnel Drum and Fluid Bed. The company manufactures Biscuit Bread making Machine, Toffee Hard Boiled Sweet Machine, Chewing Gum making Machine, Boilers, Themopack, Sigma Kneaders, High Speed Mixers, Planetary Mixers and Powder Mixers, Weighing machines.

For further details, contact:

Bombay Industrial Engineers
13, Crystal Apartment
Gulmohar Cross Road
11, J.V.P.D Bombay 400 049
Tel: 6232810 • Telefax: 6201914
Email: ijsehgal@bom5.vsnl.net.in

METERING/DOSING PUMP



PreciDose, who are known for their excellent quality and state of the art technology have added one more feature in their cap by developing ultra high precision metering/ dosing pump-L Series guaranteed for 3 years from the date of installation.

Complete range, rugged, reliable and accurate dosing/metering pumps are the result of in-house research at PreciDose. Complete Dosing Systems with or without automation can be supplied. These L-Series pumps incorporate DAD (Digital Adjustment Device) to adjust the flow rate. Even a layman can control the capacity without any error because of DAD.

Needless to mention that PreciDose is also known for their absolutely Leakfree Hydraulically as well as Mechanically operated Glandless Diaphragm Pumps. The ultra pressure plunger as well as diaphragm pumps for Thermal Power Stations are also very popular. Pump discharge capacity from 0.5 to 10,000 LPH, discharge pressure up to 700 kg/cm² and SS 316, Hastelloy - B or C, Polypropylene, PVC, Glass filled PTFE etc... material of construction can be supplied to suit the application.

For more details, contact:

PreciDose Pumps & Systems
9, Deep Akruti, Nr. L.G. Hospital,
Maninagar, Ahmedabad 380 008
Telefax: 079-5830762/5835062/5893868
Email: vbs@icenet.net

DIETARY FIBRE CONCENTRATES

Clarico-FPC (India) are the marketing agents of J. Rettenmaier & Sohne, GmbH & Co., Germany for their various range of natural food ingredients widely used in processed food industry. J. Rettenmaier are the world's leader in insoluble dietary fibres. Their brand name is VITACEL.

Vitacel wheat fibres are neutral in taste, odourless and have excellent water retention capacity. The fibres hold water by capillary effect and the release is slow. As the water is in the form of bound moisture, there is no microbial growth. Vitacel is temperature resistant and does not undergo changes in oleic and alkaline solutions.

Vitacel Wheat Fibres finds application in baked goods, processed meat, snacks by keeping the product fresh for a longer time and also increasing yield and also reducing fat consumption.

A special grade of Vitacel Wheat Fibre also has the property of natural anti-caking agents. It can be used in savoury flavours and dry blends for this property.

Apple and Orange-Fibre finds usage in nutraceuticals, dietary drinks and specialized bakery preparations. The soluble fibre content in these fibres are more than wheat fibres and as such more therapeutic benefits in the product.

Tomato Fibre has excellent water retention capacity and very good gelling properties. It can be used in ketchups and purees. In fact, it helps in preventing phase separation.

VIVASOY soy milk powder finds usage in nutraceuticals, high energy foods and coffee creamer. It is by itself a complete food with excellent combination of protein and fats. The product has no sugars and a high content of polyunsaturated fatty acids, thus making it an ideal product to be incorporated in Nutraceuticals for therapeutical segments.

For more details, contact:

Clarico-FPC (India) Pvt. Ltd.
601, Gateway Plaza
Hiranandani Gardens, Powai
Mumbai 400076
Tel: 91-22-5704411
Fax: 91-22-5704412
Email: info@clarico-fpc.com
Visit us at: www.clarico-fpc.com

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Citric Acid • Tartaric Acid • Stearic Acid
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Glycerine • Food Flavours • Food Colours
Food Chemicals

Contact :

P.M. VORA & CO.

Ramesh Chamber, First Floor,
14, Garibdas Street, Vadgadi,
Mumbai 400 003
Tel: 3438487 / Telefax: 3445367
Resi: 8647275 / 8073565
Email: hopl@bom5.vsnl.net.in

FLAVOURS OF THE NEW MILLENNIUM

NOVA FLAVOURS & FRAGRANCES (P) LTD.

Head Office:

301, Sterling Estate, 3rd Floor, Plot No. 8,
Inside Spectra Motor Compound, Ramchandra Lane
Extension, Kachpada, Malad (W), Mumbai 400 064.
Tel: 8446405 / 8446481 / Telefax: 8812059
Email: hopl@bom5.vsnl.net.in

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EXCELLENT QUALITY GROOVE AND FLAT RUBBER STEREOS FOR ALL KIND OF PACKAGING PRODUCTS BY :

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B.NO.
MFG. DT.APR.99
EXP. DT. MAY 2005
R.P.RS. : 25-55 L.T.E.

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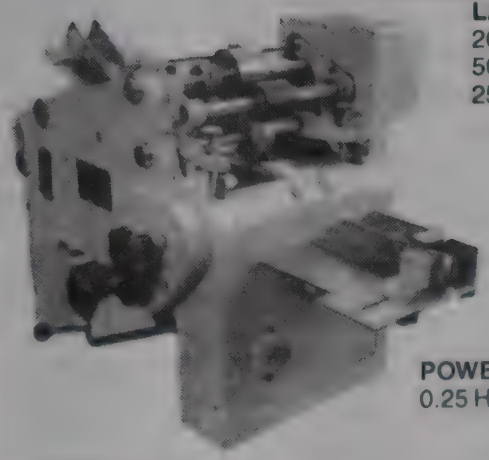
- AUTOMATIC/SEMI AUTOMATIC CAP SEALING M/C
- STICKER LABELLING M/C.
- SEMI AUTOMATIC LABELLING M/C.
- FILTER PRESS

CONTACT : WORKS : 5890193

GARUDA ENGINEERS
RUDRAX-II, SHED NO 3, G.I.D.C. PHASE III, VATVA,
OPP ANNAPURNA RESTAURANT, AHMEDABAD-382 445.
FAX (079) 2165739 PAGER : 9628702754

HIGH SPEED AUTOMATIC LABEL CODE PRINTING M/C.

GEW-250



TECHNICAL SPECIFICATIONS

LABEL SIZE :
205 mm x 155 mm Maximum
50 mm x 20 mm Minimum
25 mm x 16 mm Special Size

OUTPUT :
125 Labels per minute
180 Labels per minute
250 Labels per minute

POWER :
0.25 HP/ 1440 RPM / 414 V./3 Phase

Also Available High Speed Auto. Carton Code Printing M/C GEW-250 C

OUR OTHER RANGE :

- AUTO LINEAR TUBE FILLING AND CRIMPING MACHINE (PNEUMATIC SYSTEM)
- SEMI AUTO. ROPP CAP SEALING MACHINE
- S.S. CENTRIFUGAL PUMP

Semi Auto. Code Printing Machine GEW-45.

GOPAL ENGINEERING WORKS
2/4, 5, KAILASH IND. ESTATE, B/H, C.M.C. ODHAV,
AHMEDABAD - 382 415. INDIA **TELE/FAX : (079) 287 49 69**

FROZEN DOUGH

Prima Food Pte. Ltd. is a wholly owned subsidiary of Prima Limited, which is listed on the Singapore Exchange... Prima food boasts two main business areas - value-added food manufacturing and franchising.

In addition to the successful PrimaDeli bakery franchise and food manufacturing business, Prima food also manufactures Prima Taste, an extensive range of ready-to-cook pastes and premixes for authentic-tasting Singapore fare like laksa, mee siam, chicken rice, prawn mee, mee rebus, popiah and satay bee hoon. Recently, Prima Taste extended its range of products to include pastes and premixes for chilli crab, bah kut teh, satay, Singapore curry, Indian curry and Japanese curry.

Prima Limited was founded in 1961 as one of the pioneer flour millers in Southeast Asia. Since then, the company has diversified into feed milling, food manufacturing, restaurants, bakery franchising, R&D services, bakery equipment distribution, information technology, trading investments and property. It is now an established international industry group based in Singapore, with overseas operations in Malaysia, Sri Lanka, China, USA, Canada and Australia.

PrimaDeli Frozen Dough provides a cost-effective solution for the foodservice industry. PrimaDeli Frozen Dough produces a choice range of bakery products that taste as good as hand-made.

For further details, contact:

Prima Food Pte Ltd.
201 Keppel Road
Singapore 099419
Tel: 65-277-6830
Fax: 65-277-6885
Email: sales@primadough@prima.com.sg
Website: www.primdeli.com

RO SYSTEMS

KOMAL industries is a Water Treatment plant manufacturing company dedicated to offer to customers the finest commercial, industrial and medical Reverse Osmosis system. They are committed to provide the most innovative and technologically advanced quality system. Their knowledge and experience enables them to manufacture most of the parts in-house to ensure system reliability.

Komal Reverse Osmosis System: The unique features of KOMAL Reverse Osmosis (RO) system allows you to produce consistently high quality water for a variety of applications with their compact design, low maintenance, and simplicity in operation.

Compared with other conventional Water Treatment processes, Reverse Osmosis has proven to be the most efficient means for removing salts, chemical contaminants and heavy metals. Reverse Osmosis system removes not only salts, but micro-organisms, many high molecular weight organics, viruses, silica and particulate matters.

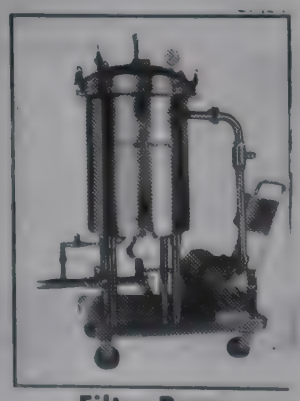
Process: Osmosis involves the exchange of dissolved substances through a permeable membrane. If the natural process of osmosis is reversed by exerting on the region of greater concentration a pressure higher than the osmotic pressure in the solution, the water diffuses through the semi permeable membrane to the other side of the system. Because the dissolved salts in the concentrated solution do not pass through the membrane, this solution becomes highly concentrated than the solution originally added to it.

If concentrated solution is continuously added to this cell under the external pressure, then there is a continuous flow of pure water from it through the membrane to the fresh water compartment. Today large number of RO Plants are in operation in all capacities ranges, especially for treating drinking water, ultra-pure water, industrial/ brakish and sea-water.

For further details, contact:

Komal Industries
108 Creative Ind. Centre
12 N.M. Joshi Marg
Lower Parel (E)
Mumbai 400 011
Tel: 3091090/3091174
Fax: 022-3062711
Email: kcc@giasbm01.vsnl.net.in

FILTER PRESS



Filter Press standard model with back wash

Kothari Pharma, offers a unique Sparkler Type Horizontal Filter Press, which enables to over come all filtration problems in pharmaceuticals, chemicals, distilleries, beverages, oil, ink and other such industries. The Filter Press has a sturdy body made out of high quality SS 304/316/ 316L metal, and comes with a mirror-polished finish.

Kothari Pharma offers various models of the Filter Press depending on output and quality of liquids. The standard models available are in the range of 8", 14", 18", 24" and 33". The filtration capacity ranges from 600 1/hr to 30,000 1/hr and the cake holding capacity from 2.2 ltrs to 230 litres. The flow rate and pump selection depends on the viscosity of the liquids.

The heart of the Filter Press is a filter cartridge assembly having SS filter plates, support screen, interlocking cup and pressure tank. Fitted with an ISI certified motor covered by SS sheet, the Filter Press is mounted on moveable SS trolley fitted with fibre castor wheels for easy movement. After filtration, the Filter Press facilitates easy removal of the cake (left-over solid matter) formed between the plates. Other salient features of the equipment includes a sample collecting device and a facility for filtering out hold up of the liquid. The convenient modular design of the filter press ensures easy operation and maintenance-free function.

Kothari Pharma, which has established a reputation in the production of a wide range of filtration equipment for the pharmaceutical and chemicals industry, also offers special facility for trial on the Horizontal Filter Press.

For further information, contact:

Kothari Pharma
C/11, M.K. Bros Indl. Estate
Jarimari, Andheri-Kurla Road
Andheri (E)
Mumbai - 400072
Tel: 8510837, 8512794, 8592888
Fax: 8513584
Email: chandrakant@kotharipharma.com
Website: www.kotharipharma.com

WASTE WATER TREATMENT

Aqua Filsep Inc. committed to Water and Waste Water Treatment, have considerable experience in providing solutions to water and waste water treatment. Consequently, the company has developed expertise in process equipment, control design, and construction of custom-engineered systems for a wide range of applications, with active support of their associates, Osmonics Corporation, USA and Aquafine Inc., USA.

The various products from **Aqua Filsep** are * Water and Waste Water Treatment Plants * Reverse Osmosis Plants, * Demineralisation Plants * Water Softening Plants * Sand Filters and Activated Charcoal Filters * Chemical Dosing Units* Mineral Water Plants * Swimming Pool Water Purification Systems * Waste Water/Effluent Treatment Plants * Clariflocculators, Clarifiers, Aerators. Water and Fuel Treatment Chemicals (For Boiler and Cooling Water Systems):

1. Corrosion Inhibitor 2. Scale Inhibitors 3. Oxygen Scavengers 4. pH Boosters 5. Fuel Additives & Combustion Catalysts.

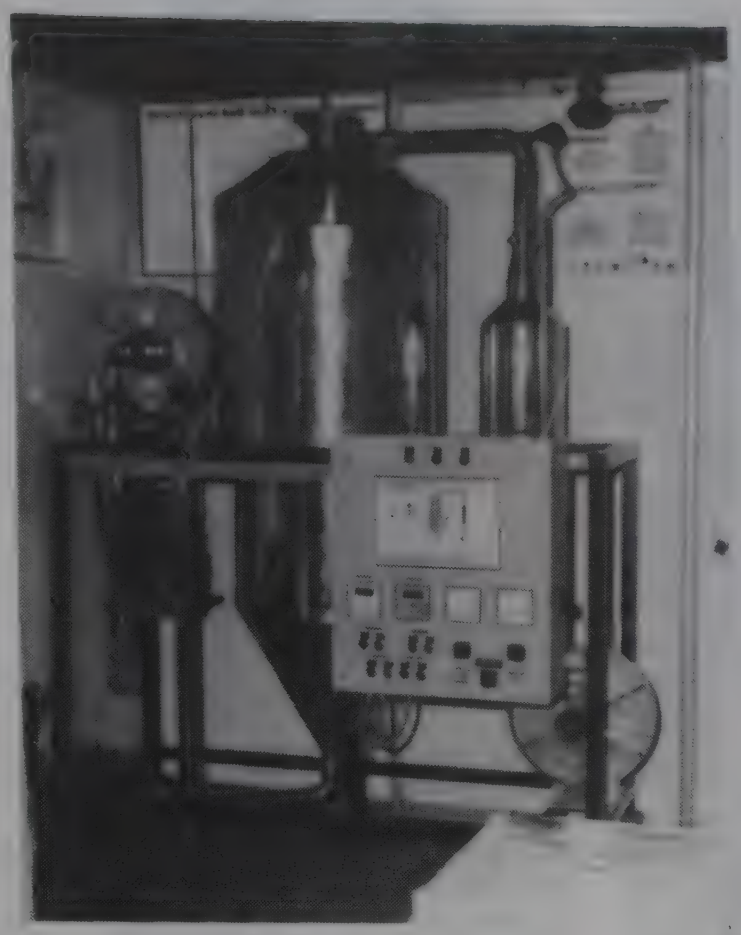
Other Related Products, Spares and Components include: * Membranes, Resins * High Pressure Pumps, Pressure Boosting Systems * Pressure Vessels * Storage tanks for special purpose etc.

The services that the company offers include: After-Sales Services & Annual Service Contract * Modification/ Automisation of existing Water & Waste Water systems etc.

For more details, contact:

Aqua Filsep Inc.
7 Retiwala Indl. Estate
H.A. Palav Marg, Byculla (East)
Mumbai 400 027
Tel: (O) 3719455, Fax: (R) 4465521
Email: filsep@ad1.vsnl.net.in
Website: www.aquafilsep.com

SPRAY DRYER



Hemraj Enterprises offer new versatile model Spray Dryer of capacity 8-10 kg/hr. water evaporation. The spray dryer is built with unique features such as: • Spray Drying with Co-current system i.e liquid spray from top or counter - current system i.e. liquid spray from bottom to produce granular/ coarser powder • Liquid can be atomized with pressure nozzle or two fluid compressed air nozzle system • Powder can be collected as a single point below the cyclone or as a two-point below the drying chamber as well as below the cyclone • Spray dryer is in complete S.S 316 construction including the supporting structure with pharma grade finish.

Customers can avail of trial facilities in this plant for testing and standardizing their products as well as spray drying larger quantity batches to test market their products. The spray dryer is supplied locally thereafter to suit exact customer requirement.

Hemraj Enterprises represent Lab-Plant Ltd., U.K. for supply of Glass Laboratory Spray Dryer SD-05 ideal for R&D applications, glass reaction as well as short path wiped wall distillation systems. More than twenty SD-05 Spray Dryers are in operation all over India as well as three reaction units recently supplied with 'Huber' continuous heating circulation equipment.

Hemraj Enterprises also offer from their principals Ohkawara Kakohki Co. Ltd., Japan, specialised application industrial Spray Drying Plants like Spray Bag Dryer, Fluidized Bed Spray Granulation Dryer etc.

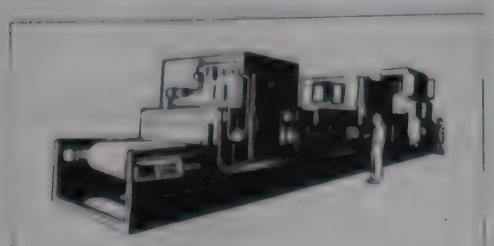
For more details, please contact:

Hemraj Enterprises
Sales Office & Pilot Plants
227, New Sonal Link Industries Estate
Bldg. No.2, 2nd Floor, Link Road
Malad (W), Mumbai 400 064
Tel: 690 6095/862 7334
Fax: 862 8727
Email: sales@hemrajindia.com
Website: www.hemrajindia.com

FOOD MACHINES

Shirsat Electronics manufacture a range of food machines such as Ovens, Dryers, Fryers, Boilers in electric, LPG, diesel, steam. These machines are custom built standard machines.

Their Roasting Oven is employed for roasting of spices and green leaf teas. The output obtained depends upon the spread, type of material, amount of moisture in the material and in the atmospheric temperature, level of roasting required.



PACKAGED CONVEYOR SYSTEM

The product is conveyored on three stainless steel bands having variable speed drive, and inverted at every fall on conveyor through the hopper insertion for toasting and drying all sides. The Roasting Oven employs infra red with adjustable intensity (or) Hot air LPG / LDO, which dries the products directly.

Other products from Shirsat are package conveyor systems, shown below

For more details, contact:

Shirsat Electronics
133, Dewan Ind. Estate
No. 6 Navghar
Vasai Rd. (E), Dist. Thane - 401210
Tel: (0250)-392946-From Mumbai 95250
Tele/Fax: (0250)-390793
Email: sakav@vsnl.com

PACKAGING MACHINES

Indvac range of machines are manufactured by Saurabh Engineers. Some of their products include Vacuum Packaging machines which are available in table top, nitrogen flushing machines for pillow packing of potato wafer in pouches, Shrink wrapping machines in conveyorised Tunnel type models, are their other products.

Impulse/Hotbar Sealers, Special Purpose Long Sealers, Continuous Sealers and Vertical Sealers are also manufactured by Saurabh Engineers.

For further details, contact:

Saurabh Engineers
11, Upvan Co. Op. Hsg. Soc. Ltd.
Off. 132 Ft Ring Road
Ahmedabad 400 051
Tel: (O & R) 6765115, 6760292
(Fact.) 2740288, 2732428
Fax: 91-79-6765115/2740288
Email: indvac@ad1.vsnl.net.in
Website: www.indvac.com

FRUIT PROCESSING MACHINERIES

Since 30 years M/s. Techno-Equipments has been manufacturing and supplying high quality Fruit Processing Machinery to leading Fruit Processors.

The high quality of the machine as per the specification given is due to the expertise and dedication of Food Technology/ Engineering in this field.

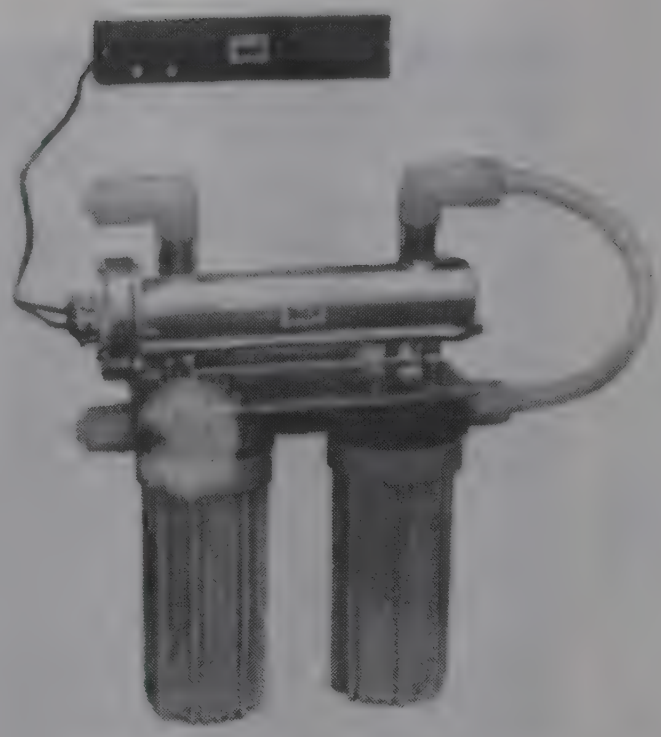
All machines are designed and fabricated under the supervision of Senior Technologists and experienced engineers, by maintaining strict quality control from procurement of raw material to the final assmbly under going rigid tests before it leaves the factory.

Techno-Equipments is manufacturing machines like Exhaust-box, Retorts, Steam jackets kettles with/without anchor type stirrers, Fruit Pulpers, Fruit Mills, Juice Extractors, Vacuum Bottle Fillers/Washers, Pineapple Slicers and Papaya Cubers with s.s. Tanks.

For more details, contact:

Techno-Equipments
9, Satyam Industrial Estate
Behind USV Ltd.
Off. B.K. Devashi Marg
Govandi, Mumbai 400 088
Tel: 5515640

WATER FILTERATION UNIT



The filler is designed to supply odour free and clean water @ 750 lts./hour. The unit comprises of 10 micron filter, carbon filter, 5 micron filter & UV Sterilizer. The minimum operating pressure required is 2.5 kg/sq. m and operating voltage 230 V AC. The first chamber filters dus particles upto 10 micron size. The second chamber holds the 5 micron and activated carbon cartridge. The third chamber holds 2 UV lamps o 8 watts each. The lamps eliminate microscopic pathogens such as bacteria & viruses. The unit is despatched in pre-assembled condition in order to avoid any installation errors. The entire system is arranged on a bracket and can be easily mounted on a wall. Proper maintenance and check ensures a good life for the system. The unit is ideal for Clubs/ Bars/Hotels/Restaurants/Resorts/ Small scale soda factories etc., Other machines available with M.G. Industries are Soda/Soft drinks machines, Bottles cleaning machines.

For more details, contact:

M. G. Industries
1/11 Venkataswamy Naidu Industrial Est.
Bharathi Colony
Peelamedu, Coimbatore 641 004
Tel: 0422-232867
Fax: 0422-235297
Email: mgi@vsnl.com

SPECIALITY CHEMICALS/ ESSENTIAL OILS

Established in 1966 by Mr. H.N. Gogia, Gogia Chemical Industries is a pioneer in orange oil cold press. They meet the requirements of all the major flavours and fragrances houses.

The Company started the manufacturing of Flavours a few year later and received a very good response from the market.

It is now one of the leaders in food flavouring and is associated with quite a large number of Industrial houses, having a clientelle of over 2000 in the domestic market which include manufacturers of confectioneries, fast foods, pharmaceuticals etc.

Presently, the company is manufacturing various natural Essential Oils, Aromatic Chemicals and Speciality Chemicals, under brand name 'Peacock' which are being sold across the country, and are also being exported to USA, European countries, Sri Lanka and South Africa.

For further details contact :

Gogia Chemical Industries Pvt. Ltd.
A-127, Okhla Industrial Area,
Phase-II, New Delhi - 110020
Tel: 6836007, 6910329, 6925664
Fax : 011-6840763
Email: gcipl@vsnl.com
Website: www.gogia.com

CODING MACHINE

It is mandatory for manufacturers of packaged goods to code information like B.No., Dt of manufacture. Expiry date, Prices and other statutory information on various packing, pouches. Pic Friction Driven Coding Machines are the best options for coding on Plastic, HDPE Bottles, Pouches, Tin containers, Woven sacks, Paper, etc. The machine is compact and consistent in printing quality, easy to install and to operate and has nickelless coated metal body.

Features: Continuous motion coder for making Batch No., Date of Mfg., Price and other statutory information on flat surfaces, is ideal for dairy milk packing applications and is mechanically synchronized with parent machine motions. It has been specially designed for easy and quick mounting on Milk/Ghee Oil pouch filling machines, Mineral water packing machines and Blister packing machine.

It is especially designed with adjustable handle to adjust in any direction for better results. **Specifications:** PIC 164, 3 or 4 lines printing. **Speed:** Up to 100 operation/ Minute **Charge of Ink:** 10ml approx. and it prints more than 10,000 impressions per charge of ink **Element:** Specially manufactured PIC cylindrical Cartridges made from best quality imported base material. These are rechargeable Rubber/ Polymer Flat Stereo **Weight:** Approx. 2.0 Kg (Model No. 164) **Printing Area:** 30 x 120 mm **Printing Media:** Specially formulated PIC-AF-2R coding inks in red, green, blue, black, violet, brown colours in various standard packings.

For further details, contact:

Process Instrumentation & Control
305, Galaxy Complex
Opp. Sarabhai Main Gate
Wadi Wadi, Baroda 390 007
Tel: +91-0265-357228/320756
Fax: +91-0265-355429/303259
Email: picarora@hotmail.com
info@piccode.com

STACKED RING FILTERS

Kumar Process Consultants are manufacturers of stacked Ring Filters, ideally suited for clarification of Sugar Syrup, Honey, Wine, Beer, Fruit Juices and Pharmaceutical products. Filter is made of a shell fitted with filter elements formed by stacking of specially designed rings on a machined rod to form a cylinderical porous structure which is rigid having a flow volute on the internals. These elements are coated with filtered to form a sturdy and porous filter bed. The fluid which is to be filtered is passed through this and the filtered fluid in taken to collection tank or for down stream processing.

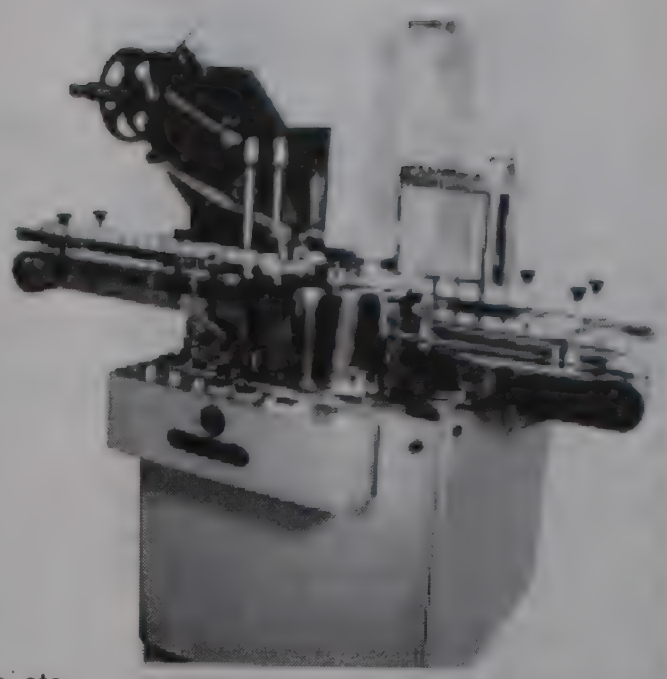
The stacked filter ring is compact, requiring no consumable spares. It is made of SS316 and Sealing gaskets in Silicon, PTFE and viton to with stand hot water sanitization or stream sterilization. Unit does not need to be dismantled for cleaning.

For more details, contact:

Kumar Process Consultants & Chemicals Pvt. Ltd.
230/4, Ashoka House,
Behind Hotel Sheetal Arch
Linking Road
Bandra (W)
Mumbai 400 050
Telefax: 6451964, 6420637, 6432512
Email: kumarfil@vsnl.com

FOIL SEALING MACHINE

This sealing machine from Jet Pack Machines can be used for sealing the neck of PET/HDPE containers. The purpose for sealing is to prevent the product inside the container from pilferage or losing aroma, characteristics etc. The machine accommodates different type of foils like Aluminium Poly/ Paper Poly/Lacquer Coated Paper etc. The machine can give speeds of upto 70 seals per min. depending on the size of the container and the weight. This machine finds application in Masala(chilli powder, hing, readymade masala etc), Glucose Powder flow wrap or any other hygroscopic powders, Pharmaceutical powders, Adhesives etc. The machine can be connected to filling as well as capping machine.



Other machines manufactured by Jet Pack are: Semi Automatic and Automatic (Single and Twin Head) Powder Filling Machine, Semi Automatic and Automatic (Single and Twin Head) Cream/Paste filling Machine, Automatic Capping and Cap Pressing Machine, Automatic Flow Wrapping Machine, Automatic Bottom Coding Machine, Automatic Composite Can Filling/ Sealing machine and Special Purpose Machine.

For further information, contact:

Jet Pack Machines
C-18, Nand Jyot Indl. Est.,
Safed Pool, Andheri Kurla Road,
Saki Naka, Mumbai 400 072.
Tel: 91-22-8516489/8515561
Fax: 91-22-8516489
Email: jetpack@vsnl.com

OZONATORS

Creative Concept has launched microprocessor based OZ AIR series of Ozone Generators, Ozone Sterilization Systems and Ozone Monitors for Disinfection of Air, Water and Food items. These intelligent Ozonators can decide about "Ozone Dosing" and "Duration of Operation" for achieving total disinfection in a specific area. Ozone Generators and monitors have digital Ozone Concentration Alarm settings, duration of operation etc.

Ozone is the fastest acting oxidizing disinfectant and the most efficient broad-spectrum micro-biological agent commercially available. Being highly reactive and completely non-discriminating it acts immediately. This makes Ozone a very powerful bactericidal agent. Ozone as unlike any other oxidizing agent leaves no toxic residues, thereby being environmentally friendly and helps reduce pollution.

These Ozonators are user friendly, better maintainable State-of-the-art, equipped with a provision of remote control.

For further details, contact:

Creative Concepts
F-60, Sector 8
Noida 201301
Telefax: 011-4523339/4552249, 4543337
Email: concept@nda.vsnl.com

FOOD & BEVERAGE MACHINERY

Chhaya Enterprises are manufacturers of Food and Beverage Machinery. The company are specialists in manufacturing, Syringes, Lobe Pumps and Machinery parts.

The Colloid Mill and Volumetric Fillers are used by Food and Beverage industry all over the country.

For further details, contact:

Chhaya Enterprise
C-5, Parle Colony, Sahar Road
Vile Parle (E)
Mumbai 400 057
Tel: 8329259 (R) 8205584

RANGE OF EQUIPMENT

Adam Fabriwerk Pvt. Ltd. design and manufacture equipment for food, ayurvedic and allied industries keeping in view the technological developments in the world.

We offer complete manufacturing facility for Shrikhand with GMP (paint free construction) and CIP and SIP for batch size of 100 to 5000 kgs. The facility consists of manufacturing vessels / transfer pump / working platform / product piping / storage vessels / electrical control panel / vacuum pump / metering pump.

The salient features of our facility are: • The plant is designed to be operated by one helper. • Material tranfers are done by vacuum. • Vessels are GMP (paint free construction) and are suitable for vacuum. • Gaskets used are of silicon (food grade). • Contact parts are of SS316 and are finished to class 4B (Mirror) finish and are crevice free. • Entry of high shear emulsification head is from bottom through a specially designed mechanical seal and water circulation system equipment with water detection sensor. • The high shear emulsification head is bottom mounted and acts as a pump to recirculate the products during manufacturing and discharges the product in storage vessels after the process is completed. • Vessels are designed for 1kg /sq. cm. and 700 mm vacuum and can be sterilised. • The storage vessels are of 500 kgs. for all sizes of plant above 500 kgs. and are mobile and can be connected to the filling machine through digital metering pump. • Pipes, pipe fitting and valves are of SS 316, seamless, internally electropolished with DIN standard unions, • The control panel visually shows all operations of the plant on a mimic diagram. • Manhole of all the vessels are equipped with davit fitting and the cover of the manhole slides instead of being lifted.

For more details, contact:

Adam Fabriwerk Pvt. Ltd.
203, Rajgure Apts.,
New Nagardas Road
Andheri (W), Mumbai-400069
Tel: 022-8380548/8384173
Fax: 022-839-0195
Email: adamfab@vsnl.com

TURNKEY MINERAL WATER PROJECT/WATER TREATMENT

Aguapuro Equipments offer turnkey mineral water projects and water treatment projects ranging from Dosing Equipment, Multimedia Sand/Carbon Filters, Softeners, Demineralisation Systems, Reverse Osmosis Systems (UF/NANO), Micron Filters/UV, Sterilizer systems, Ozonators. They also provide spares and services for any make of water treatment plants.

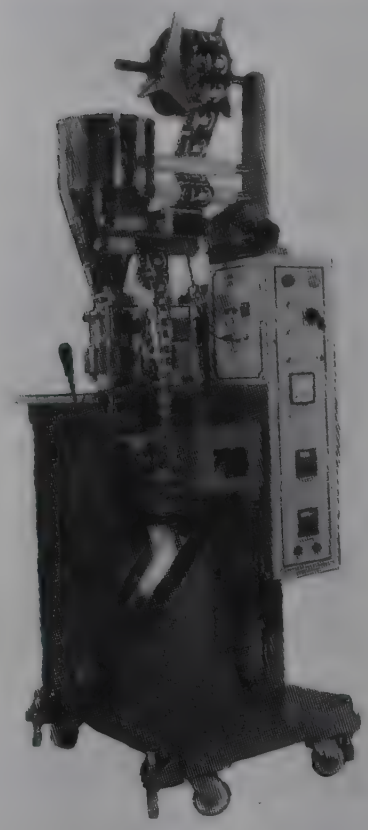
Special features of these are • compact skid mounted systems • specially designed for individual application • Economical and fast delivery.

The company also provides turnkey projects for manufacturing mineral/pure water.

For further details, contact:

Aguapuro Equipments
2/22, Panwala Bldg.
Dr. S.S. Rao Road
Lalbaug, Mumbai 400012
Tel: 4101432, 4155576
Fax: 4155576
Email: aquapuro@vsnl.com
Website: www.aquapuro.s5.com

FORM-FILL-SEAL MACHINE



The fully automatic vertical form-fill-seal machine from Gurdeep Packaging finds application for packing any free flowing powder and granules, spices, soup-concentrates, soft drink concentrates, pharmaceutical powder, detergents, tea/coffee, pan masala, supari, confectioneries etc.

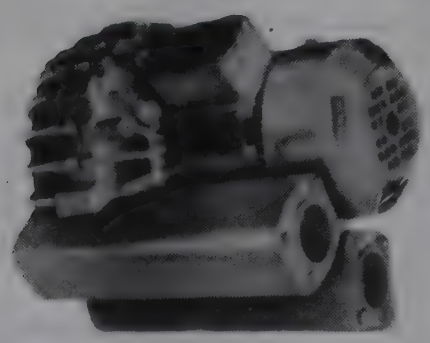
Specifications:

Sealing Type: 3 sides sealing/4 sides sealing. Packing Size: 50-120mm, or 100-240mm (film length). 20-160 mm, or 20-220 mm (film width). (enlarged type can be made upon order). Speed: 45-90 bags/min, 60-120 bags/min. (Depending on flowing rate and volume on packing objects). Packing Material: All heat sealable laminate PET/POLY, PET/FOIL/POLY MET, PET/POLY/CPP/OPP etc...

For your requirements, contact:

Gurdeep Packaging Machines
Harichand Compound,
L.B.S. Marg,
Vikhroli, Mumbai 400 079.
Tel: 5783521, 5772846, 5795982
Fax: 91-22-5772846

TURBINE BLOWERS/EXHAUSTERS



Acmevac Sales Pvt. Ltd., have now extended the range of their Turbine Blowers/Exhausters and these are now available from 0.5 HP to 15 HP. These are regenerative Blowers can be used for vacuum or pressure applications.

The impeller is directly mounted on the motor shaft itself. There are no rubbing parts and hence these blowers are practically maintenance-free and absolutely oil-free. Noise levels are considerably reduced as silencers are provided. These blowers are particularly useful in areas where oil free, continuous non-pulsating air flow is required.

Applications include Air Tables, Agitation/Aeration, Vacuum hold down and pick up, Air blow off, Aquaculture, Pneumatic conveying etc. etc.

For further details, contact:

Acmevac Sales Pvt. Ltd.
109, Unique House
Cardinal Gracious Road
Chakala, Andheri (E)
Mumbai 400 099
Tel: 022-8329647/8375837/8381053
Fax: 022-8364977
Email: acmevac@bom3.vsnl.net.in
Internet: www.selpages.com/ads/acmevac

LABORATORY INSTRUMENTS/ EQUIPMENT

Lab Instruments supply Laboratory Instruments and equipment for Research Education and various industries. Some of their products are UDV Spectro-photometers, Electronic Balances, Ion Analysers & Electrodes, Tintometers, Viscometers, Refrigerated Centrifuge, pH Meter/Conductivity Meter, BOD Incubators, Polarimeter/Refractometer, Stirrers and Emulsifiers, Heating Mantles, Test Sieves, Filter Paper, etc.

For further details, contact:

Lab Instruments
78 (B) Jagannath Sankar Seth Road
"Ratnadeep", Near Roxy
Opera House, Mumbai 400 004
Tel: 3690973,3681316, Fax: 3690973

TUBE FILLING/SEALING MACHINE

Norden of Sweden has developed innovative sealing methods, such as Hot Air Sealing and Design-A-Seal, which enjoys worldwide patent.

Design-A-Seal, as the name suggests, offers 10 different sealing shapes on the tubes to suit individual design needs and is undoubtedly the most aesthetic and strongest seal available in the market.

Design-A-Seal not only increases the shelf appeal of products but also the sales volume as well. The other technical developments are: Servo lifting mechanism, robot feeding systems, CIP-SIP cleaning

Norden has a range of machines with output of 40, 70, 140, 200 and 300 tubes per minute, depending upon the type of tube and product to be filled. Batch coding facility on tubes is also available.

Rieco Industries are the exclusive representatives for Norden in India.

For further details. contact:

Rieco Industries Ltd.
1162 / 2, Behind Observatory
Shivajinagar, Pune 411 005
Tel: 020 - 5535215, 5535384
Fax: 5533229
Email: package@rieco.com
reico@vsnl.com

FLAVOURS/ESSENTIAL OILS

This Bombay-based company manufactures a wide range of Liquid Flavours, Emulsions and Pastes, Culinary Essences and Essential Oils which find application in industries like aerated and non-aerated Soft Drinks, Biscuit & Confectionery, Dairy, Snacks & Savouries, Chewing Gums as well as, Health Beverages, etc.

For your requirements, contact:

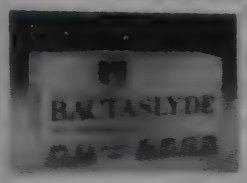
Nova Flavours & Fragrances (P) Ltd.
301, Sterling Estate, 3rd Floor, Plot No. 8
Inside Spectra Motor Compound
Ramchandra Lane Extension, Kachpada
Malad (W), Mumbai 400 064
Tel: 8446405,8446481 Telefax: 8812058
Email: hopl@bom5.vsnl.net.in

Did you know that invisible Monsters are eating into your product quality?

Yes, Bacteria!

Bacteria cause : • Spoilage of food products, Milk and Dairy produce • Spread of decease through water and food products • Reduction of product quality and shelf life

Now detect Bacteria easily with



BACTASLYDE

Microbiology laboratory not required

- Can be used by **anybody**
- Extremely easy to use and quick
- No capital investment • Economical
- Can be used at site very effectively.

BACTASLYDE can be used for detecting microbial contamination of all kinds of materials viz, Metal working Fluids, Process waters, Foods, Soft drinks, Paint and Pigments etc.

RAKIRO BIOTECH

1, New Modella Industrial Estate, Padwal Nagar, Wagle Estate, Thane - 400 604
Tel.: +91 (22) 583 6846

Bombay Industrial Engineers

13, Crystal Apartments,
Gulmohar Cross Road, 11 J.V. P.D.
Bombay 400 049
Tel : 6232810 • Telefax:620 1914
Email: ijsehgal@bom5.vsnl.net.in

* **FOOD PROCESSING MACHINERY: Pulpers, Juice Extractors, Steam Jacketed Kettles, Fruit Slicers-Crushers, Mango Cutter & Canning Retorts**
* **Hot/Cold Liquid Filling Lines, Bottle Closing Powder Filling, Form Fill Sealing Machines**
* **DRYERS - Tray, Tunnel, Drum, Fluid Bed**
* **Biscuit-Bread making Machinery**
* **Toffee-Hard Boiled Sweet Machinery**
* **Chewing Gum making Machinery**
* **Cloth Raising Machine**
* **Boilers - Thermopacks**
* **Sigma Kneaders, High Speed Mixers Planetary Mixers & Powder Mixers**
* **Weighing Machines**
* **BOPP/Industrial Tapes Manufacturing Machine & Plant**

SHAM - Manufacturer of **Standard Flavours, Flavour Concentrates, Speciality Flavours & Reconstituted Oils** for **FOOD WORLD** offers at affordable Prices the following:

STANDARD FLAVOURS: Almond-roasted /sweet, Apple, Badam-Pista-Kesar, Banana, Butter, Butter-scotch, Butter-Vanilla, Cardamon, Cheese, Cherry, Choco-butter, Chocolate-Sweet/White/Bourbon, Cinnamon, Coconut-Sweet/Milky/Toasted, Cola, Ginger, Grape, Guava, Honey, Kesar-Elaichi, Kesar-Milky, Kewra-Rose, Khus-Rose, Lemon, Lime, Lime-n-lemon, Litchi, Malt, Mango-Alphonso, Marie-Biscuit, Milk Delite, Milk-Popular, Milk-Rose, Milk-cooked, Mixed-fruit, Mosambi-juicy, Nutmeg, Orange-Juicy, Pan-Masala, Passion-Fruit, Peach, Pep-mint, Pineapple-Fresh, Pineapple-Singapore, Pista, Raspberry, Royal-Rose, Spearmint, Strawberry, Tango, Tutti-Frutty, Vanilla-Dark/Royal, Vanilla-Milky, etc.

SPECIALITY FLAVOURS (Available in P.G./Oil Soluble Grades): Amla, Apple-Simla, Black-Currant, Blue-berry, Butter-Sweet, Butterscotch-nutty, Caramel, Charcaroma, Elaichi-Divine, Cashewnut, Chocolate-Bourbon, Chocolate - Milky, Coconut-Toasted, Guava, Jackfruit, Lemon, Lime, Litchi-Sweet, Mango-Candy, Mango-Milky, Alphonso-Divine, Milk-Fresh, Mandarin, Orange-Juicy/Divine, Pan-Masala, Passion-fruit, Kesar, Strawberry-fresh, Thandai, Tomato, Vanilla-velvet & MILK-ZABARDAST - O.S. and many more...

FLAVOUR CONCENTRATES (To prepare Ready flavours by adding recommended P.G.) Apple, Banana, Black-Currant, Cardamon, Elaichi, Butterscotch, Cocoa-Chocolate, Coconut, Guava, Litchi-Shahi, Mango-Alphonso, Pan-Masala, Passion-fruit, Peach, Pineapple-fresh, Pineapple-Singapore, Raspberry, Roasted-only, Royal-Rose, Rose-Belgium, Strawberry, Toasted-only.

RECONSTITUTED OILS: Bucchu, Cardamon-Normal, Cardamon-Divine, Cola, Lemon, Lime, Lime-Lemon, Orange-Sweet, Orange-Juicy, Orange-Divine, Mandarin, Mandarin-Divine, Pan-Masala-Kolkata, Pan Masala-Green, Pan Masala-Divine, Pep-mint, Tango

Available Low-Price Normal grades : a) VANILLA-RUNNER-NS6288-Rs.35.00; b) BUTTER-FAST-NS6010-Rs.29.50 c) CHOCOLATE-PLAIN-NS6390-Rs. 135.00 & d) READY GLUCOSE-BISCUIT FLV-NS6565-Rs. 140.00 and e) MILK POPULAR-NS6095-Rs. 195.00 (rates per kilo nett-Ex-factory) Packing in 20/50 kgs Carboys for Vanilla & Butter For other Products - 1 kg bottle & 5 kg Carboys: - Excise: Under exemption-Excise Invoice will be given Sales Tax: 15.3% or 4% with "C" form extra. Available-Free Samples of 1 kg Vanilla-Runner & Butter-Fast for Testing OUR OIL - SOLUBLE FLAVOURS ARE RECOMMENDED FOR HIGH HEAT APPLICATIONS.

TRADE ENQUIRIES SOLICITED

Please Contact: SHAM EXTRACT FORMULATIONS
Thane, Maharashtra, INDIA. Tel: 5404152, Fax: 022-5371616/5415739. Email: sham@vsnl.com

LIQUID FILLING MACHINES

H.P. Industries manufacture a range of Special Purpose Machines. Among the Filling machines manufactured by them is the automatic liquid filling machine which is used to fill liquid and pastes. The machine is automatic with high speed extreme accuracy. It accepts any container and is simple to operate. It works independently of human error and fatigue.

H.P. Industries filling machines are Rotary Gravity fillers with high flow rate value and capping heads. They are fully automatic machines designed for filling plastic, glass or metal containers ranging in sizes from 100 ml to 22 litres. The fillers feature stainless steel construction to handle hot or cold liquids and to maintain machine integrity even in repetitive high volume filling.

This machine can give you an output of 25 bottles per minute to 150 bottles per minute. The main advantage of the filling machine is its easy clean-up facility. The machine is most suitable for filling mineral water, milk, juices, oil, cream and other flowable liquids.

The machines not only fills containers but also sorts or carries them to and from the filler. It can be taken on a conveyor to one end of the line and service other features such as rinsing, labelling and coding etc.

Service excellence is more than a matter of pride at HP Industries. It is the central reason behind the development and growth of the company.

For more details, contact:

H.P. Industries
2 Joquim Cottage
Vazir Glass Works Road
J.B. Nagar, Opp. Tata Infotech Ltd.
Andheri (East)
Mumbai - 400 059
Tel: 835 2505, 839 2883
Fax: 091-022-4305504

FOOD INGREDIENTS

Jay Chem Marketing are authorised distributors for various food Ingredients and Preservatives such as Aspartame, Acesulfame K, Calcium propionate, Carrageenan, Enzymes, Glucone, Delta Lactone, Glyceryl Mono Stearate (GMS), Mono Sodium Glutamate, Pectin, Potassium Sorbate, Sorbic Acid, Sweetners and Xanthan Gum.

The ingredients are available regularly and at competitive prices.

For your requirements, contact:

Jay Chem Marketing
B/5, 3rd Floor, Nemi Krishna Society
V. L. Road
Kandivali (W)
Mumbai 400 067
Tel: 022 8020141/8061337
Fax: 022 8061337
Email: jaychem@bom3.vsnl.net.in

HYDRAULIC ELEVATING WORK PLATFORM

The 'Tiger' Hydraulic Elevating Work Platform can contribute greatly to improve workers' safety, reducte in labour cost, eliminate the need of expensive and time consuming scaffolds and ladders.

The 'Tiger' Hydraulic Elevating Work Platform is being used for overhead electrical maintenance work, welding work, painting, steam and oil pipe line repairs and air-condition ducting in all types of industry.

Available both mobile and stationery, it helps the operator to lift or transfer loads from floor to floor, loading to vehicles or unloading and also for doing maintenance work conveniently at any working height.

Some of their reputed customers are: Vikram Sarabhai Space Centre, SHAR Rocket Launching Centre, Indian Space Research Organisation, MICO, BHEL, BEML, NGEF Ltd, TVS-Suzuki, Escorts Ltd., Bhabha Atomic Research Centre, Tata Cummins Ltd., Central Power Research Institute, Electronics Research Laboratory Grindwell Norton Ltd., Larsen and Toubro Ltd., HAL, HMT Ltd., among others

For further details, contact:

Ferro Foundries Private Limited
Yelwal Road
Belwadi P.O.
Mysore 571186
Tel: 402376, 402633 (R): 510878
Fax: 0091-0821-402052

CORRUGATED TUBE HEAT EXCHANGE

ECOFLUX corrugated Tube Heat Exchangers have been introduced by Praj Industries of Pune. These are specially designed to meet the hygienic requirements in fruit processing applications like fruit pulps, purees, juices and slices.

Corrugated patterns on the tubes offer better heat transfer co-efficient and uniform temperature distribution, thereby maintaining the consistency and quality of the end product.

The ECOFLUX Exchangers offer significant advantages over conventional methods i.e. ● Compact sizes, saves on space ● longer running time, as the turbulent flow reduces fouling ● ease of inspection and cleaning ensures lower downtime ● low product hold-up ● high response to CIP which reduce changes of product contamination ● shorter residence time ● no moving parts, hence lower energy consumption ● double, triple or multi-tube construction for different applications.

For further details, contact:

Praj Industries Ltd.
Praj House
Bavdhan, Pune - 411 021
Tel : 91-2139-52214/51511
Fax: 91-2139-51718/51515
Email: cthe@praj.net
Website: http://www.praj.net

FILLING MACHINES

Apex Electromec Pharma Pvt. Ltd., having industrial machine manufacturing experience of nearly two decade, has made its formidable foray in food and beverage Industry.

The company manufactures single and multiheaded automatic powder/granule Fillers. The accessories it offers for the filling line are swing and slat conveyor, turntable, endless packing conveyor and combicapping multiheaded machine.

Apex Electromec Pharma also offers Infrared Ray Dryers and Material Handling equipments like fixed lifter, mobile stacker, lifters and filter and round IPC.

For more details, contact:

Apex Electromec Pharma Pvt. Ltd.
16, Nitin Indl. Complex
Ghaitan Area, # 1, S.P. Road
Near Vaishali Nagar
Dahisar (E), Mumbai 400 068
Tel: 8964096 • Telefax: 8960263
Fax: 8968615
Email: apexppl@hotmail.com
Website: www.apexelectromec.com

★ ★ ★ ★ ★

MASALAS

Bawa Masala Co. Pvt. Ltd., established in 1952 with a small unit having capacity to produce merely four basic spices, is today a giant masala company.

It is "One Window to the world of Taste and Flavour". Par-Excellence experience and expertise with consolidation of four and half decades in manufacturing Spices, BMC today has an enviable reputation both in domestic and international market.

BMC enhances the latest technology in the process of manufacturing hence BMC products undergo stringent quality tests. They are packed to keep due freshness, before declared fit for market.

Hi-tech production plants and diligent supervision at each stage during production ensures best quality. BMC products offer a vast range of variety challenging the taste buds of every gourmet.

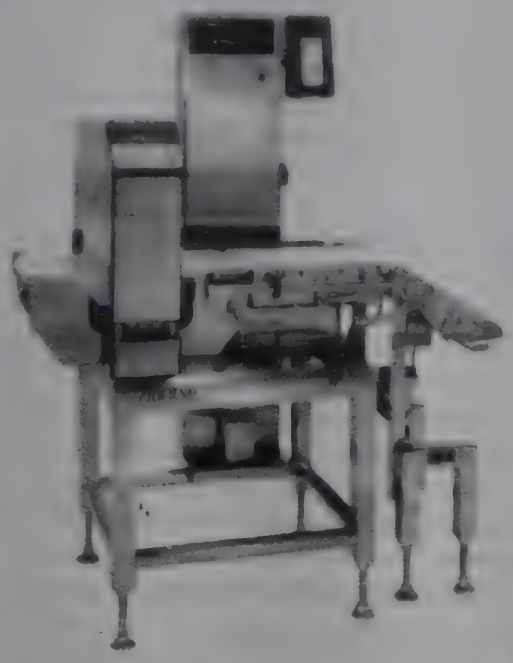
Their products include Garam masala • Sabzi masala • Fish/Meat/Chicken masala • Pulao/Biryani masala • Sambhar masala • Pav bhaji masala • Black/white pepper powder • Ginger powder • Jaljeera powder • Channa masala • Chat masala • Ajinomoto • Dry Mango powder and many more.

For further details, contact:

Bawa Masala Co. Pvt. Ltd.
G-20, Lawrence Road, Industrial Area
Delhi 110035
Tel: 011-7194268, 7197011
Telefax: 011-7194264
Email: bmc@ndf.vsnl.net.in
Website: www.bmcspices.com

CHECK WEIGHERS

Anritsu has made revolutionary technical developments and improvements to meet users diverse requirements in a variety of markets including food, cosmetics, electronic components, chemicals and pharmaceutical industries.



This new line of IP series Check weighers are compatible with HACCP (Hazard Area Critical Control Point) / GMP (Good Manufacturing Practices). They are developed around twin philosophy of Safety and Sanitation.

Check Weighers are quality control systems based on weight measurement used mainly on Food and Pharmaceutical packaging lines they perform: • Gross Weight Check • Item/content Shortage • Grading • Net Weight Measurement • Filling Control.

These are On-line continuous weight measurement systems. The unwanted products are eliminated automatically without stopping the lines.

These check weighers are All Stainless Steel construction. Waterproof IP-66 completely washable units. They are available in wide weighing range and accuracy and can handle 400 products per minute. Anritsu has developed over 100 optional accessories based on their wide experience. These check weigher also features advanced DSP (digital single processing) technology. Safety is supreme in Food Industry so fail safe functions and also capability to store statistical data for QC/QA and events recording for analysis and maintenance have been added. The display is capable of showing graphs and various other useful data. One touch removal conveyor and no drive belts facilitates easy cleaning.

Anritsu is an ISO 9001/ISO 14001 accredited USD 1.3 Billion turnover company occupying No.1 position in industrial on-line checking and inspection equipment. The state-of art machines are offered/serviced in India by Jay Instruments Systems Pvt. Ltd.

For further details, contact:

Jay Instruments & Systems Pvt. Ltd. (JISL)
C-64, TTC Industrial Area
Turbhe , Navi Mumbai 400 705
Tel: 022-7670092/7672955
Fax: 022-7670161
Email: wssales@jayinst.com

LIQUID LEVEL GAUGE

'Cristal', offers Liquid Level Gauge measurements from simple tubular type to tailormade to specific requirements like Reflex gauges, Transparent Gauges for high pressure and temperature application. Also special function gauges like non-frosting type, large chamber, heated gauge and welding pad types are offered. Top and bottom automatic ball-check shut-off valves are provided for trouble-free service at economical cost.

'Cristal' Gauges are extensively used for accurate observation of levels in pressure vessels, boilers, process tanks, liquid containers etc.

The company also offers Magnetic Level Indicator which can be used in hazardous and toxic liquids since medium is completely isolated from the indicating system.

For further details, contact:

Cristal Instruments
224, Raja Ind. Est.
P. K. Road, Mumbai 400 080
Tel: 569 3893 / 561 1012
Fax: 022-560 3474
Email: cristal@roltanet.com

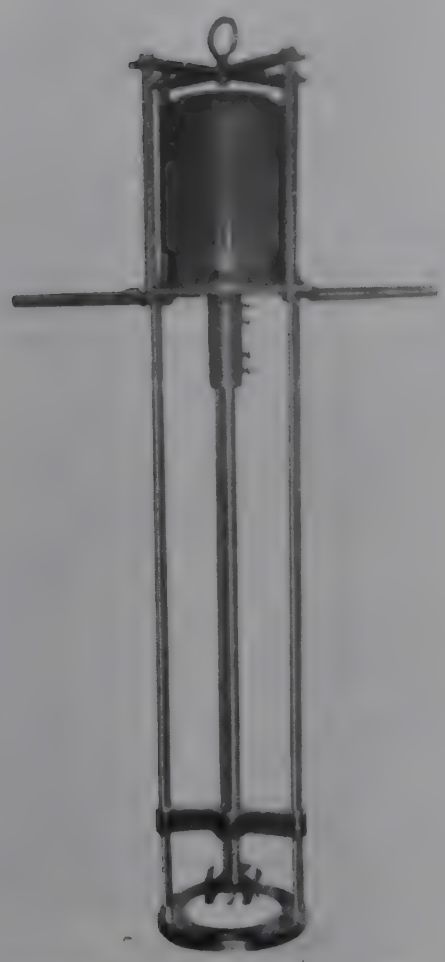
RUBBER STEREOS

Garuda Engineers are manufacturers of excellent quality groove and flat rubber stereos for all kinds of packaging products mostly used by Pharmaceuticals Foods, Pesticides, Agro, Distillers, Beverages and Packaging industries. Other machines available with them are • Fully automatic high speed label and carton coding machines • Blister and strip packing machines • Pouch packing machines for liquid, powder and granule filling • Ampoule/vial/bottle washing, drying, filling and sealing machines • Automatic/Semiautomatic cap sealing machine • Semi automatic labelling machine • Filter press.

For further details, contact:

Garuda Engineers
Rudrax II, Shed No.3
G.I.D.C. Phase III
Vatva, Opp. Annapurna Restaurant
Ahmedabad 382445
Fax: 079-2165739
Pager 9628702754
Tel: (Works) 079-5890193

STIRRERS



COSYWO has developed profit boosting design of **Stirrers,** equipments and machinery considering Operational convenience time saving, labour saving and trouble solving problem with guarantee for Performance, Dependebility and less breakdowns. The commitment to product development and improving process knowledge is continuous.

COSYWO's objective is perfect job, expertise, quick Service, superior quality and fulfilment of its responsibilities to customers. They provide guaranteed solution for mixing problems.

COSYWO has vast experience in modifying/modernising/manufacturing customs built **Stirrers** with excellent workmanship. No matter how small your mixing need or how large and complex you can mix with the best.

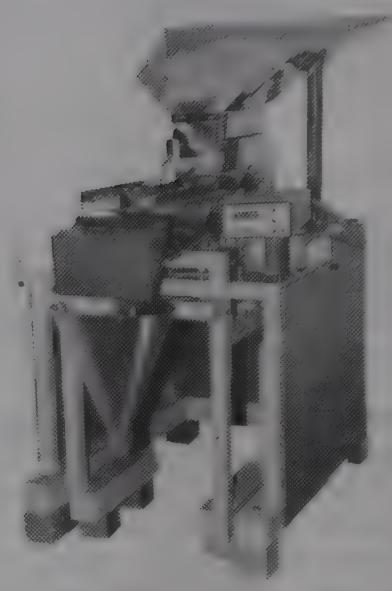
COSYWO is specialist of Rubber Sleeve Expander • Roller for Textile Steel Plastic Aluminium foil Leather cloth and Paper S S Guide Roller • Batching Roller • Cloth scutcher • Gum Mixing pans • S S size mixing tank • Water Line Sand Filter Lab Mangle • S S Poteye • S S Ager Patti • Farakadi • Reaction vessels • Ball Mill • All products are manufactured in well equipped workshop vigorously tested and precisely inspected to achieve desired results.

They are leading manufacturers since 1960 for Stirrers • Agitators • Emulsifiers • Dispersers • Homogenisers • Disintegrators • Attritors • Conical Blenders.

For further details, please contact:

Cosywo™ Engineering Company
15, Laxmi Co-op Industrial Estate
Near Nagarvel Hanuman Mandir
Amraiwadi Road
Ahmedabad 380 026
Telefax (O): 91-079-2748168/2748001
Email: cosywo@usa.net
Website: www.indianic.com/cosywo

WEIGH- FILL MACHINES



Kaizen Enterprises offer *Kaizen Tula* semi-automatic weigh-fill machines for packaging tea, coffee, beans, sugar, grains, farsans, wafers, oilseeds, pulses, dryfruit, etc.

The microprocessor Weigh Controller is used for accurate weigh controlling along with loadcells and electromagnetic vibrator. The filling range is from 50gms - 1kg and 1kg to 5kg. The product hardly needs any maintenance. Twin head and multihead versions are also available.

For more details, contact:

Kaizen Enterprises
A-5, Trupti, G.V. Scheme Rd. #4
Mulund (E), Mumbai 400081
Telefax: 5646873
Email: kaizen@zeenext.com

BAKING MACHINE

R&D Engineers are India's first & foremost manufacturers of Wafer biscuit & Ice-cream cone machines. Their years of experience and with the application of latest design and technologies to meet exacting market demand. Their product ranges from small table top machines to fully automatic machines. They also design and supply tailor made solutions to an individual customer need.

R&D Machines are characterized by highest standards in precision, in operating ease, utmost durability and service life.

The "ZE" series of semiautomatic machines are used for baking ice cream cones, sugarcane and cups. These machines are easy to use and are robust. The heating is by electrical heaters designed to optimize energy use and thermal distribution, still flexible for high production on nonstop basic for 24 hours.

The machines manufactured by them are Ice cream Cone baking machine, Batter mixing machine. Automatic Wafer baking machine, Manual Baking Tongs, Rolled Sugar cone machines, Automatic and Semi-Automatic baking machines.

For more details, contact:

R&D Engineers
A-41, IDA Kukatpally, Phase II
Road No. 4, Via I.E.
Gandhi Nagar, Hyderabad 500 037
Tel: 3079121, 3079878
Fax: 91-40-3078668
Email: randengg@hd1.vsnl.net.in
Website: www.rnwafers.com

THINWALLED PLASTIC CONTAINERS

K. Raheja Mercantile Corporation are the manufacturers of transparent & opaque white injection moulded Plastic Containers ranging from 100 ml to 2000 ml. These containers are airtight, food grade, micro-waveable (for reheating) as well as deep freezable, and stackable are available in various shapes. The containers have multipurpose utility and used in various Industries and such as Food Packaging industry like for Ice creams, Shrikhand, Cheese, Bread Spread, Dairy Products, Carry Home Foods, Tea, Medicines etc.

For further details, contact:

K. Raheja Mercantile Corporation
108, New India Ind. Estate
Off Mahakali Caves Road
Andheri (E), Mumbai 400093
Tel: 6910759, 6910760, 6910761, 839-4665/66
Fax: 91-22-6910758
Email: sales@krahejacontainers.com
Website: http://www.krahejacontainers.com

WALK IN COOLERS/FREEZERS

Premier was founded in 1988 concentrating on the development production and marketing of industrial commercial refrigeration systems in India Today the company is a leadin manufacturer of industrial chilling system known for setting standards in an otherwis disorganised sector. Premier has thre different divisions to take care of custome interests: 1. Industrial Process Division 2 Commercial Equipment Division 3. Foo Refrigeration Division.

Premier has a global outlook and keeping this in vision they have business associations with some international companies.

Premier is the authorised distributor for Technoblock Cold Room Units & Cold Room Panels of Refrigeration SPA of Italy in India. Premier builds and installs custom-designed pre-fabricated walk in coolers/freezers. Technoblock is an ISO 9001 & CE certified company and have received international recognition for quality standards.

Premier-Technoblock units can be used to maintain temperature of +5°C to (-) 50°C It is one of the largest companies in the world & they market their products globally in more than 160 countries and they make more then 40,000 units annually.

Features: ★ Wall mounting/Ceiling Mounting & Split System ★ Hermetic or semihermatic compressor★ Condensation by air or water ★ Electronic control on the unit or the remote control panel, defrost by air, by hot gas or by heaters.

The panels are available in Polyurethane thickness of 60 mm to 160 mm thickness with width of 500 mm to 1500 mm. The panels are of international standard density 40kg/m³. The fixing is by camlock arrangements embedded in the polyurethane. The polyurethane is sandwiched between two sheets. The floor insulation are base panels or slabs with vapour proofing and with marine ply and aluminium chequred plate.

Premier installs and maintains an extensive range of structures from modular coldrooms and massive coldstore complexes to fireproof freezer rooms. Special environmental Test Bed Structures, accoustic panels and sound baths.

For further details, contact:

Premier Refrigeration Limited
1 Akurli Ind. Est., Akurli Road
Kandivali (E), Mumbai 400 101
Tel: 91-22-8870304 (5 Lines)
Fax: 91-22-8841275, 8875507
Email: premierchiller@vsnl.com

CAP SEALING MACHINES

Raj Products & Equipments Pvt. Ltd. marketed Twist-off Lug Cap Sealing Machines. The machine hermitically seals the bottled products with twist-off/vacuseal Lug Cap to preserve the taste and flavour of the products. The Lug cap Sealers using latest technology eliminates the work of holding the glass bottle during capping and does not need a skilled worker. It gives effortless manually operation of replacing bottles one after another.

More than 100 machines are being used all over India.

For further details, contact:

Raj Products & Equipments Pvt. Ltd.
P.O.Box 8075
Mumbai 400 056
Tel: 816 2250 • Telefax: 91-22-8162750
Email: foramfod@bom5.vsnl.net.in

FOOD PROCESSING EQUIPMENT

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For further details, contact:

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Plot No. C-7/1, TTC Area
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Behind Savita Chemical
Navi Mumbai 400 705
Tel: 7906450/51, 7610907
Tel/Fax: 7906451

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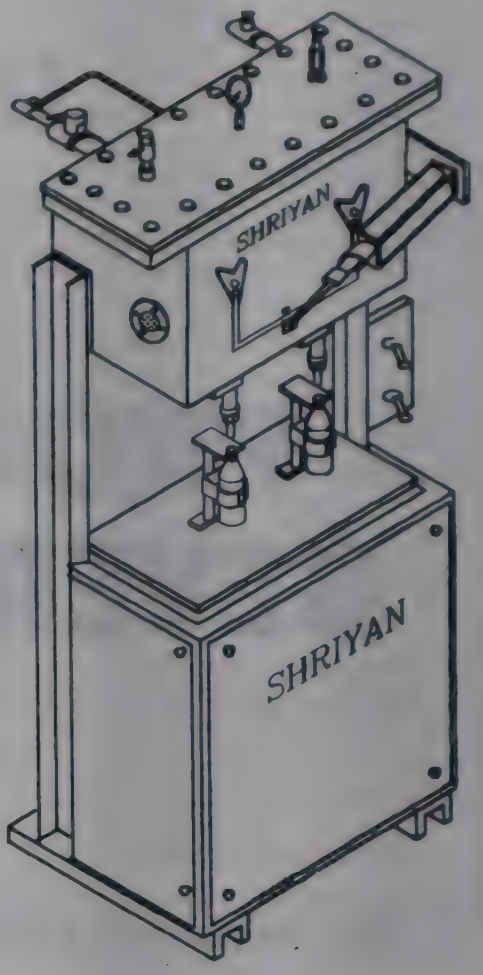

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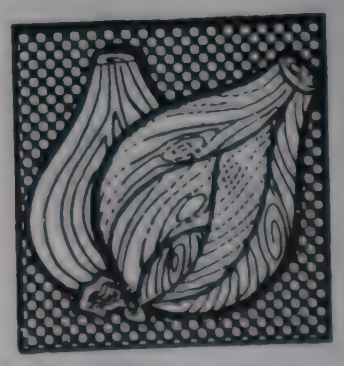

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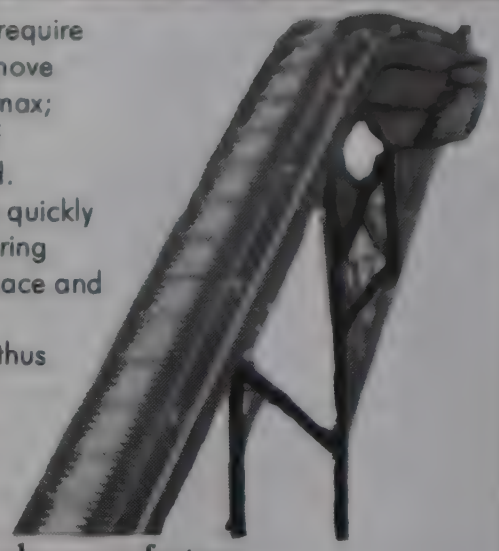

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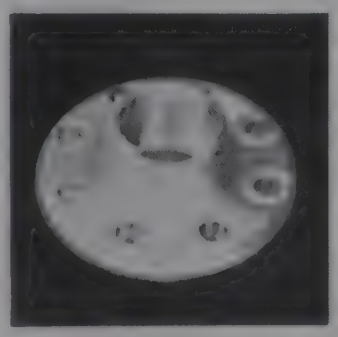
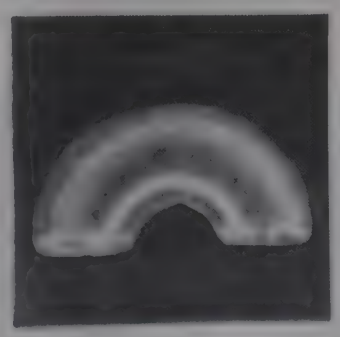
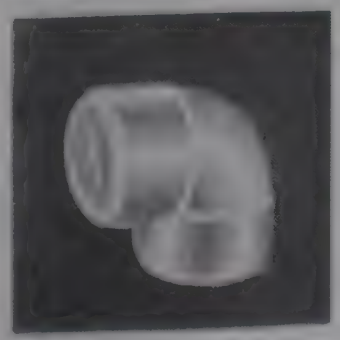

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CODISSA — The First International Trade Fair Complex of India

CODISSA - Coimbatore District small Industries Association was established in 1969 having a support of over 4000 industries. Coimbatore is the second largest city of Tamil Nadu "abunding in variety of large, medium and small industries well over 40,000 in the fields of Textiles, General Engineering, Machine Tools, Metallurgy, Textile Machinery, Farm Equipment, Home Appliances, Automobiles, innovative Agricultural research institutions. Codissa is activity involved in various activities supporting growth of industry and plan and develop infrastructural facilities for exposition of products and services through Trade fairs.

Codissa has been conducting with great success Trade Fairs in the name of INTEC since 1988. The growing demand for Trade Fairs and the inadequate facility to accommodate all the aspiring participants made CODISSIA to think in terms of setting up a Trade Fair Complex of permanent nature in Coimbatore not only to conduct their fairs comfortably but also to help other Fair Organisers to use the infrastructure for the betterment of the trade and industry. Moreover, the industrial city Coimbatore is also strategically located in the South India which is ideal to host fairs and exhibitions of various fields and industries.

In the year 1995 a trust was promoted by CODISSIA in the name of "Codissia Intec Technology Centre". The Trust's primary objectives was to create & promote necessary infrastructure facilities for conducting Trade Fairs, Industrial Exhibitions. etc. to accelerate industrial growth

A 40-acre vantage site was procured near NH47 high way with close by civil aerodrome. The foundation stone for the Complex was laid by the Chief Minister of Tamil Nadu Dr. M. Karunanidhi on 12th January 1997.

Facilities: The facilities of the Codissia Trade Fair Complex are exemplary. The Complex boasts of largest pillar-free exhibition hall in the country. The total built up exhibition area with service amenities measure 10,500 sq. mtr. The roof of the Complex is provided with galvalume sheets imported from Australia. The entrance to the premises is through an elegantly designed pyramid. A large paved area outside the building along with panoramic landscape gives room for the visitors to relax. An airconditioned hall of 230 sqr. mtr. in the mezzanine floor can be used for seminars, workshops and other meetings.

Achievement: The first fair, INTEC 2000 was held in January 2000. This was followed by Indian Foundry Congress concurrent with IFEX 2000 Exhibition conducted by institute of Indian Foundrymen in February. Next, Confederation of Indian Industry conducted its prestigious South India's largest Auto Exhibition AUTO FOCUS 2000 at the beginning of the August. The next event was South India's largest Agricultural Exhibition AGRI INTEX 2000 jointly organised by Tamil Nadu Agricultural University. Coimbatore (the ancient and the best Agri University in the country) and CODDISSIA from 29th Aug. to 3rd Sept. 2000. Following AGRI INTEX 2000, CODISSIA conducted an Expo of Home Products "LIFE STYLE 2000" during 12-22 Oct. 2000 at the Complex to showcase a wide range of home products with success.

Works for the second agricultural international exhibition "AGRI INTEX 2001" to be held from 1st to 7th August 2001 are afoot already, which is expected to surpass the achievement of other similar fairs in the country.

The facilities of this Complex have already started making international attraction. Messe Dusseldorf International GmbH from the country of trade fairs Germany, have shown keen interest in staging their fairs here and has booked entire Complex for their Fair to be held in Feb. 2002.

Future Objectives: Besides trade fair and exhibitions, the Trust's objectives include providing training, conducting programmes & courses to impart knowledge and skills to students, executives and entrepreneurs; arranging seminars, conferences, buyer seller meets, conventions, market research & development etc. all with a view to making considerable contribution to the advancement of trade and industry in the country. This dream of a project has been brought into reality by the wonderful team spirit and collective concerted efforts of the CODISSIA members under the able guidance of the distinguished Governing Council members and the industrialists of Coimbatore. This Trade Fair Complex is the first for South India and the only other facility in the country besides Pragati Maidan at New Delhi.

Now CODISSIA aims to make this great city the **Hannover of India!** With the continuing excellent support of the local bodies and the Government, CODISSIA has every confidence that they are on the way to achieve this task with the beckoning of the trade and industry for more and more such exhibitions and events in multifarious fields.

CODISSIA Trade Fair Complex is on par with international standards offering inimitable world class facilities most essential for a World Class Trade Fair.

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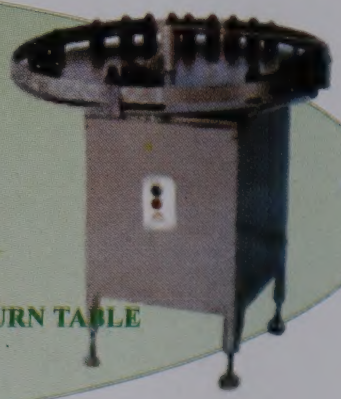

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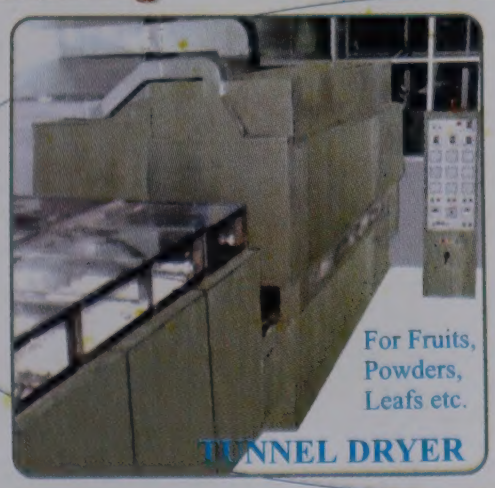

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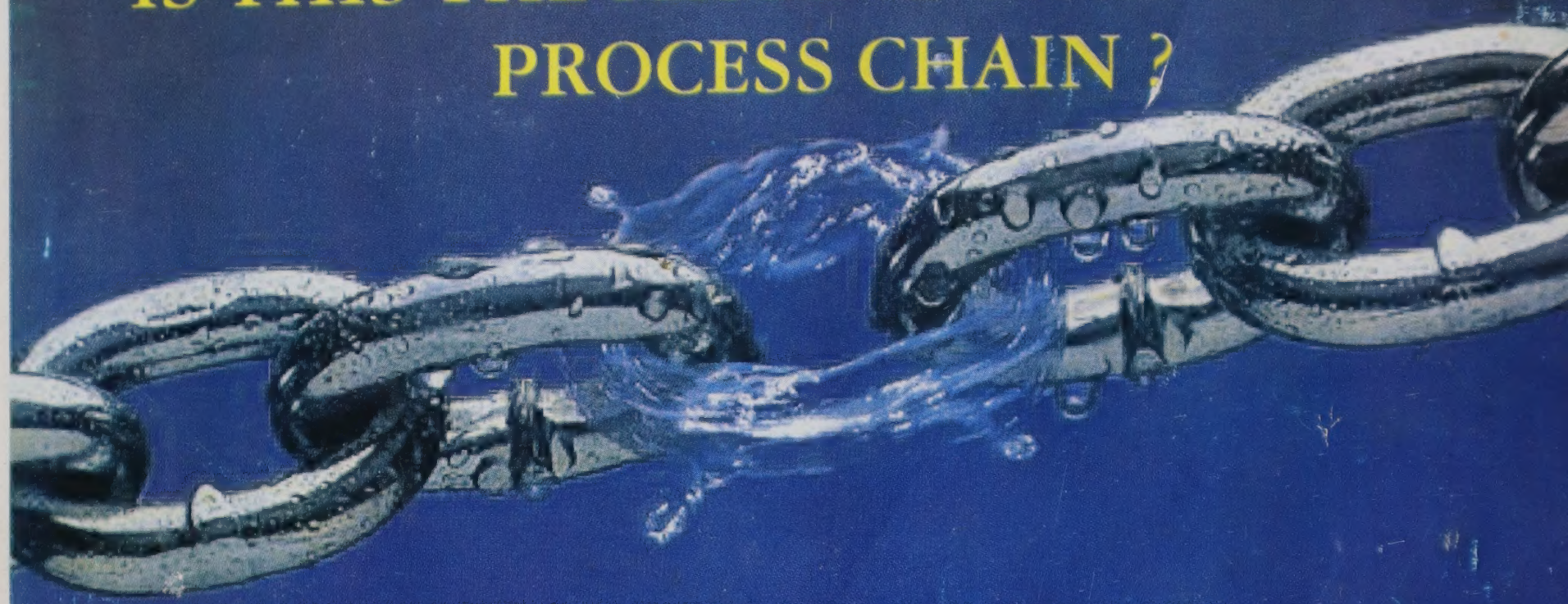

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